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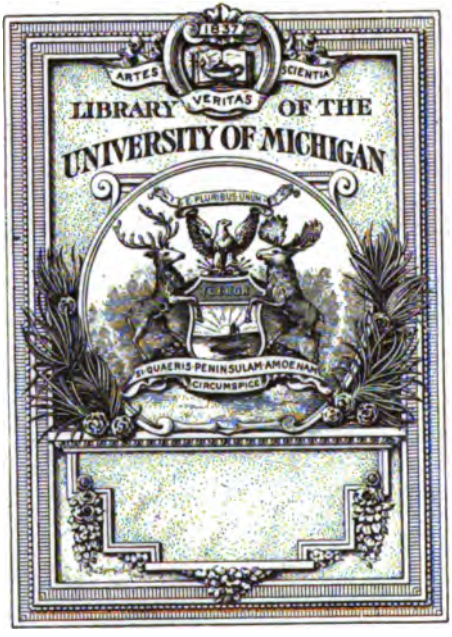
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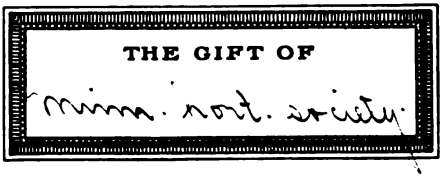
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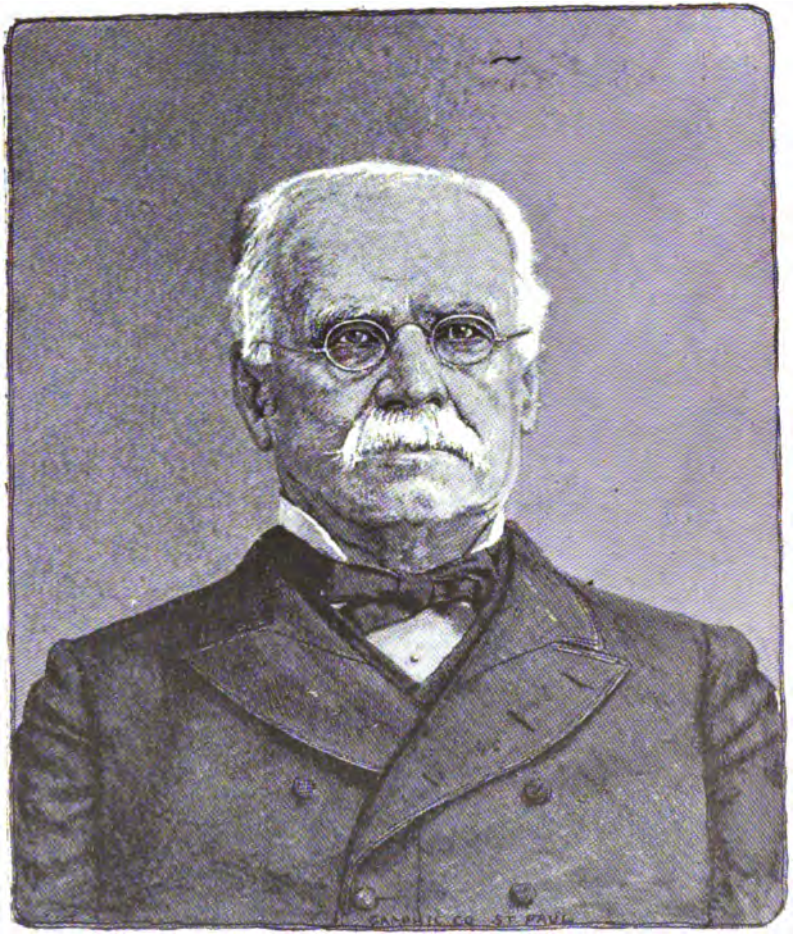
Minn. Hort. Society



S. A. Robertson

(For Biographical Sketch see page 445.)

ANNUAL REPORT

OF THE

MINNESOTA STATE

HORTICULTURAL SOCIETY

FOR THE YEAR 1889,

EMBRACING THE

TRANSACTIONS OF THE SOCIETY FROM MARCH 31, 1888, TO MARCH 31, 1889, ALSO PROCEEDINGS OF THE ANNUAL MEETING OF THE MINNESOTA AMBER CANE ASSOCIATION, ESSAYS, REPORTS, ETC.

VOL. XVII.

Prepared by the Secretary, S. D. HILLMAN, Minneapolis, Minn.

ST. PAUL, MINN.:
THE PIONEER PRESS COMPANY.
1889.

LETTER OF TRANSMITTAL TO THE GOVERNOR.

OFFICE OF SECRETARY,
MINNEAPOLIS, March 30, 1889.

To Hon. Wm. R. Merriam, Governor of Minnesota,

SIR: I have the honor to submit herewith, in compliance with legal requisition, the accompanying report for 1889, with supplementary papers.

Respectfully yours,

S. D. HILLMAN,

Secretary Minnesota State Horticultural Society.

OFFICERS AND MEMBERS FOR 1889.

PRESIDENT.

WYMAN ELLIOT.....Minneapolis.

VICE PRESIDENTS.

A. W. SIAS.....Rochester.
ALFRED TERRY.....Slayton.
M. CUTLER.....Sumter.
M. PEARSE.....Chowan.
J. O. BARRETT.....Browns Valley.

SECRETARY.

S. D. HILLMAN.....Minneapolis.

TREASURER.

DITUS DAY.....Farmington.

EXECUTIVE COMMITTEE.

The President, Secretary and Treasurer *ex-officio* and

A. W. LATHAM, Chairman.....Excelsior.
J. S. HARRIS.....La Crescent.
J. M. UNDERWOOD.....Lake City.
O. F. BRAND.....Faribault.
L. H. WILCOX.....Hastings.

ENTOMOLOGIST.

PROF. O. W. OESTLUND.....Minneapolis.

LIBRARIAN.

E. A. CUZNER.....Minneapolis.

COMMITTEE ON LIBRARY.

WYMAN ELLIOT, J. H. STEVENS, S. D. HILLMAN.

179973

SUPERINTENDENTS OF EXPERIMENTAL STATIONS.

PROF. SAMUEL B. GREEN...University Farm, St. Anthony Park.
E. H. S. DARTT.....Owatonna.
PETER M. GIDEON.....Excelsior.
J. S. HARRIS.....La Crescent.
O. M. LORD.....Minnesota City.
UNDERWOOD & EMERY.....Lake City.
A. W. SIAS.....Rochester.
O. F. BRAND.....Faribault.
M. PEARSE.....Minneapolis.
G. W. FULLER.....Litchfield.
R. M. PROBSTFIELD.....Moorhead.
ANDREW PETERSON.....Waconia.
CHARLES LUEDLOFF.....Carver.
B. TAYLOR.....Forestville.
FRED VON BAUMBACH.....Alexandria.
L. E. DAY.....Farmington.

GENERAL FRUIT COMMITTEE.

SIDNEY CORP.....Hammond.
D. K. MICHENOR.....Etna.
J. C. KRAMER.....La Crescent.
O. E. SAUNDERS.....Granite Falls.
O. F. NORWOOD.....Balaton, Murray county.
M. C. BUNNELL.....Newport.
N. J. STUBBS.....Long Lake.
WILLIAM MCHENRY.....St. Charles.
O. M. LORD.....Minnesota City.
CLARENCE WEDGE.....Albert Lea.
GEORGE E. CASE.....St. Peter.
M. CUTLER.....Sumter.
G. W. FULLER.....Litchfield.
L. E. DAY.....Farmington.
CHARLES LUEDLOFF.....Carver.
W. H. BRIMHALL.....Hamline.
J. H. LUDLOW.....Worthington.

COMMITTEE ON LEGISLATION.

WYMAN ELLIOT.....Minneapolis.
J. T. GRIMES.....Minneapolis.
J. S. HARRIS.....La Crescent.

The members of the General Fruit Committee are expected to report separately on all matters of interest in horticulture, but more espicially to bring to the notice of the society new and mproved fruits.

COMMITTEE ON SEEDLING FRUITS.

J. S. HARRIS.....La Crescent.
A. W. SIAS.....Rochester.
G. W. FULLER.....Litchfield.

COMMITTEE ON APPLES, PEARS AND PLUMS.

J. S. HARRIS.....La Crescent.
O. M. LORD.....Minnesota City.
ADFRED TERRY.....Slayton.

COMMITTEE ON NATIVE FRUITS.

J. O. BARRETT.....Browns Valley.
OLIVER GIBBS JR.....Ramsay, S. Dakota.
CHAS. LUEDLOFF.....Carver.

COMMITTEE ON RUSSIAN APPLES.

E. H. S. DARTT.....Owatonna.
WILLIAM SOMERVILLE.....Viola.
A. PETERSON.....Carver.

COMMITTEE ON GRAPES AND SEEDLINGS.

GEO. R. ROBINSON.....Minneapolis.
C. H. GREENMAN.....Chatfield.
J. S. FEATHERSTONE.....Nininger.

COMMITTEE ON GRAPE INSECTS AND DISEASES.

J. S. HARRIS.....La Crescent.
A. W. LATHAM.....Excelsior.
J. NORQUIST.....Red Wing.

COMMITTEE ON EXPLORATION FRUITS AND FLOWERS.

PROF. SAMUEL B. GREEN.....St. Anthony Park.
O. F. BRAND.....Faribault.
J. M. UNDERWOOD.....Lake City.

COMMITTEE ON FORESTRY.

C. L. SMITH.....Minneapolis.
J. O. BARRETT.....Browns Valley.
CHAS. LUEDLOFF.....Carver.

COMMITTEE ON EVERGREENS.

J. T. GRIMES.....Minneapolis.
C. F. MILLER.....Faribault.
F. G. GOULD.....Excelsior.

COMMITTEE ON DECIDUOUS TREES.

H. W. S. CLEVELAND.....Minneapolis.
S. M. EMERY.....Lake City.
FRANKLIN DE COU.....St. Paul.

COMMITTEE ON FRUIT BLOSSOMS.

L. H. WILCOX.....Hastings.
O. M. LORD.....Minnesota City.
J. S. HARRIS.....La Crescent.

COMMITTEE ON GREENHOUSES AND HOTBEDS.

E. NAGEL.....Minneapolis.
A. S. SWANSON.....St. Paul.
GUST. MALMQUIST.....Minneapolis

COMMITTEE ON FLORICULTURE.

F. H. CARLETON.....Minneapolis.
MRS. M. S. GOULD.....Excelsior.
MRS. ANNA B. UNDERWOOD.....Lake City.

COMMITTEE ON NOMENCLATURE AND CATALOGUE.

L. H. WILCOX.....Hastings.
J. S. HARRIS.....La Crescent.
S. D. HILLMAN.....Minneapolis.

COMMITTEE ON SMALL FRUITS.

H. J. LUDLOW.....Worthington.
WILLIAM DANFORTH.....Red Ring.
M. PEARSE.....Chowan.

COMMITTEE ON VEGETABLE GARDENING.

JOSHUA ALLYN.....Red Wing.
J. C. KRAMER.....La Crescent.
R. P. LUPTON.....Excelsior.

COMMITTEE ON MARKETING AND HORTICULTURAL APPLIANCES.

J. M. UNDERWOOD.....Lake City.
WILLIAM LYONS.....Minneapolis.
WILLIAM H. BRIMHALL.....Hamline.

COMMITTEE ON BOTANY.

H. WAYLAND STEDMAN.....Rochester.
NORTON F. BRAND.....Faribault.
EDGAR D. SIAS.....Rochester.

COMMITTEE ON SUGAR AND SYRUP.

J. G. BASS.....Hamline.
S. H. KENNEY.....Morristown.
C. F. MILLER.....Faribault.

COMMITTEE ON HONEY.

J. W. MURRAY.....Excelsior.
BARNETT TAYLOR.....Forestville.
WILLIAM DYAR.....Hastings.

COMMITTEE ON BREAD AND CAKE.

MISS MARY GRIMES.....Minneapolis.
MRS. E. J. STAGER.....Sauk Rapids.
MRS. G. W. SHUMAN.....Minneapolis.

COMMITTEE ON PICKLES, PRESERVES AND CANNED GOODS.

MRS. O. C. GREGG.....Minneapolis.
MISS HOYT.....Hamline.
MRS. A. A. KENNEDY.....Hutchinson.

COMMITTEE ON ENTOMOLOGY.

PROF. OTTO LUGGER.....St. Anthony Park.
R. J. MENDENHALL.....Minneapolis.
J. S. HARRIS.....La Crescent.

COMMITTEE ON ORNITHOLOGY.

J. S. HARRIS.....La Crescent.
OTTO BULLIS.....Winnebago City.
BURTON T. WILCOX.....Hastings.

COMMITTEE ON HORTICULTURAL CURIOSITIES AND NOVELTIES.

J. T. GRIMES.....Minneapolis.
M. CUTLER.....Sumter.
E. H. S. DARTT.....Owatonna.

ANNUAL MEMBERS.

ALLYN, JOSHUA.....Red Wing.
BARRETT, J. O.....Browns Valley.
BASS, J. G.....Hamline.
BLAKELEY, CAPT. RUSSELL.....St. Paul.
BOXELL, J. W.....St. Paul.
BRAND, ARCHIE N.....Faribault.
BRAND, NORTON F.....Faribault.
BRAND, O. F.....Faribault.
BROWN, A. L.....Brownton.
BROWN, C. F.....St. Peter.
BRIMHALL, WILLIAM E.....San Diego, Cal.
BRIMHALL, W. H.....Hamline.
BRYANT, MRS. L. A.....Minneapolis.
BUNNELL, M. C.....Newport.

BUSH, FRED.....Richfield.
BUSSE, H. F.....Minneapolis.
CARLETON, FRANK H.....Minneapolis.
CLARK, H. C.....Minneapolis.
COOK, DEWAIN.....Windom.
CORLETT, JOHN E.....Farmersburg.
CORP, SIDNEY.....Hammond.
CORSON, H. H.....New Richland.
CROSS, MRS. E.....Sauk Rapids.
CUTLER, MILON.....Sumter.
CUZNER, E. A.....Minneapolis.
DANFORTH, WILLIAM.....Red Wing.
DARTT, E. H. S.....Owatonna.
DAY, DITUS.....Farmington.
DOUGHTY, J. COLE.....Lake City.
EDWARDS, J. M. & SON.....Ft. Atkinson, Wis.
EMERY, S. M.....Lake City.
FRANKLAND, THOS.....Stonewall, Man.
FRISSELLE, DR. M. M.....Excelsior.
FULLER, G. W.....Litchfield.
GILBERT, FRED. A.....Beardsley.
GILMAN, J. B.....Minneapolis.
GILMORE, H.....Georgetown Wis.
GILMORE, J. F.....Richfield.
GOULD, F. G.....Excelsior.
GOULD, MRS. M. S.....Excelsior.
GRAY, J. S.....Minneapolis.
GREEN, PROF. SAMUEL B.....St. Anthony Park.
GUSTAFSON, CHARLES.....Worthington.
HALL, PROF. C. W.....Minneapolis.
HAUGAN, HON. A. C.....Minneapolis.
HARRIS, EUGENE E.....La Crescent.
HARRIS, FRANK I.....Minneapolis.
HENDRICKSON, W. G.....St. Paul.
HEIDEMAN, HON. C. W. H.....New Ulm.
HILLMAN BROS.....Minneapolis.
HILLMAN, S. D.....Minneapolis.
HOLES, ANDREW.....Moorhead.
JACKSON, E. D.....Minneapolis.
JEHU GEORGE.....Hastings.
KENNEY, SETH H.....Morristown.
KNAPHEIDE, RUDOLPH.....St. Paul.

KRAMER, J. C.....La Crescent.
LATHAM, A. W.....Excelsior.
LITTLE, JOHN.....Granton, Ont.
LIETHA, J.....Sauk Rapids.
LUEDLOFF, CHAS.....Carver.
LUNDWALL, NELSON.....Bozeman, Mont.
LUPTON, R. P.....Excelsior.
LORY, H. H.....Maple Ridge.
LYONS, JOHN.....Minneapolis.
LYONS, MISS JULIA.....Minneapolis.
LYONS, WILLIAM.....Minneapolis.
MAGWOOD, ARMOUR.....Stonewall, Man.
MCHENRY, S. A.....St. Charles.
MENDENHALL, R. J.....Minneapolis.
MILLS, L. D.....Garden City.
MINER, J. E.....Minneapolis.
MORGAN, C.....Forestville.
MOYER, LYCURGUS R.....Montevideo.
MUCKEY, DR. F. S.....Minneapolis.
NOBLE, J.....Sumter.
NORBY, A.....Madison, S. Dak.
NORQUIST, JOHN.....Red Wing.
OESTLUND, PROF. O. W.....Minneapolis.
OWENS, S. M.....Minneapolis.
PARKER, W. L.....Faribault.
PARTRIDGE, SAM.....Moorhead.
PETERSON, ANDREW.....Waconia.
PHILIPS, MRS. M. J.....West Salem, Wis.
PORTER, PROF. EDWARD D.....St. Anthony Park.
PUFFER, DR. F. L.....Bird Island.
REEVES, ELMER.....Waverly, Iowa.
RIDOUT, M. T.....Lakeside.
ROBINSON, GEO. R.....Minneapolis.
RODGERS, GEORGE.....Money Creek.
SAMSON, MRS. ALMON.....Minneapolis.
SCOTT, W. G.....Winnipeg, Man.
SHEPHERD, FRANK C.....Hastings.
SMITH, CYRUS L.....Minneapolis.
SOLEN, O. A. TH.....Halstad.
SOMERVILLE, WILLIAM.....Viola.
SPRAGUE, MRS. L. E. P.....Minneapolis.
STAGER, MRS. E. J.....Sauk Rapids.

STEINARSON, H.....Madison.
STRANDWOLD, O.....Trysil, Dak.
STUBBS, N. J.....Long Lake.
SWEENEY, DR. W. M.....Red Wing.
TAYLOR, BARNETT.....Faribault.
TAYLOR, JAMES.....Slayton.
TERRY, ALFRED.....Slayton.
THAYER, MRS. P. A.....Sauk Rapids.
UNDERWOOD, MRS. ANNA B.....Lake City.
UNDERWOOD, J. M.....Lake City.
URIE, WILLIAM.....Minneapolis.
WEBSTER, DE WITT CLINTON.....La Crescent.
WENTWORTH, DR. F. H.....Cresbard, Dak.
WILCOX, ARCHIE M.....Hastings.
WILCOX, L. H.....Hastings.
WOCHLIN, WILLIAM.....Faribault.

HONORARY MEMBERS FOR FIVE YEARS.

EDSON GAYLORD from 1886.....Nora Springs, Iowa.
J. E. CORLETT from 1887.....Farmersburg, Iowa.
B. S. HOXIE.....Evansville, Wis.
H. R. HUNTER.....Sioux Falls, S. Dak.
C. H. BRETT.....Henry, S. Dak.
J. S. B. THOMPSON, from 1888.....Grundy Centre, Iowa.
MISS EDITH A. KELLOGG.....Janesville, Wis.
PROF. W. H. RAGAN, from 1889.....Greencastle, Ind.
MRS. V. H. CAMPBELL.....Evansville, Wis.
A. J. PHILIPS.....West Salem, Wis.
ELMER REEVES.....Waverly, Iowa.
THOS. FRANKLAND.....Stonewall, Man.
C. C. BELL.....Booneville, Mo.

HONORARY LIFE MEMBERS.

HON. MARSHALL P. WILDER (deceased).....Boston, Mass.
DR. JOHN P. WARDER (deceased).....North Bend, Ohio.
DR. P. A. JEWELL (deceased).....Lake City.
HON. L. B. HODGES (deceased).....St. Paul.
D. W. HUMPHREY (deceased).....Faribault.
CHARLES HOAG (deceased).....Minneapolis.
MRS. WEALTHY GIDEON (deceased).....Excelsior.
HON. N. J. COLEMAN.....St. Louis, Mo.

GEORGE P. PEFFER.....Pewaukee, Wis.
J. C. PLUMB.....Milton, Wis.
J. M. SMITH.....Green Bay, Wis.
E. WILCOX.....La Crosse, Wis.
PROF. J. L. BUDD.....Ames, Iowa.
CHARLES GIBB..... Abbotsford, Quebec.
A. G. TUTTLE.....Baraboo, Wis.
F. K. PHOENIX.....Delavan, Wis.
J. W. MANNING.....Boston, Mass.
MRS. J. W. MANNING.....Boston, Mass.
MRS. WM. PAIST.....Hersey.
CHARLES Y. LACEY.....Fort Benton, Mont.
COL. J. H. STEVENS.....Minneapolis.
J. S. HARRIS.....La Crescent.
R. J. MENDENHALL..... Minneapolis.
H. W. S. CLEVELAND.....Minneapolis.
TRUMAN M. SMITH.....San Diego, Cal.
L. M. FORD.....San Diego, Cal.
WYMAN ELLIOT.....Minneapolis.
J. T. GRIMES.....Minneapolis.
A. W. SIAS.....Rochester.
PETER M. GIDEON.....Excelsior.
M. PEARSE.....Minneapolis.
COL. D. A. ROBERTSON..... .....St. Paul.
R. L. COTTERELL..... .....Dover.
CHARLES LUEDLOFF.....Carver.
OLIVER GIBBS, JR.....Ramsey, Dak.
ANDREW PETERSON.....Waconia.
E. H. S. DARTT.....Owatonna.
A. W. LATHAM.....Excelsior.
F. G. GOULD..... .....Excelsior.
O. F. BRAND.....Faribault.
C. L. SMITH.. ....Minneapolis.
MRS. C. O. VAN CLEVE.....Minneapolis.
MRS. JAMES BOWEN.....Minneapolis.
MRS. IDA E. TILSON.....West Salem, Wis.
MRS. H. B. SARGEANT.....Lake City.
MISS SARAH MANNING .....Lake City.

OFFICERS

OF THE

MINNESOTA STATE AGRICULTURAL SOCIETY

FOR THE YEAR 1889.

PRESIDENT.

WM. M. BUSHNELL.....St. Paul.

1ST VICE PRESIDENT.

FRED C. PILLSBURY.....Minneapolis.

2D VICE PRESIDENT.

S. M. EMERY.....Lake City.

SECRETARY.

H. R. DENNY.....Hamline.

TREASURER.

F. J. WILCOX.....Northfield.

BOARD OF MANAGERS.

JOHN F. NORRISH.....Hastings.
CLARKE CHAMBERS.....Owatonna.
W. M. LIGGETT.....Benson.
JOHN COOPER.....St. Cloud.
L. H. PROSSER.....Wykoff.
C. N. COSGROVE.....Le Sueur.

The next annual fair will be held on the State Fair grounds between Minneapolis and St. Paul, Sept. 6 to 14, inclusive, 1889. No effort will be spared to make it the best agricultural and horticultural exposition of the year.

Liberal premiums offered in every department. For further information address the secretary, as above.

CONSTITUTION

OF THE

MINNESOTA HORTICULTURAL SOCIETY.

ARTICLE I.

NAME.

This Society shall be known as the Minnesota State Horticultural Society.

ARTICLE II.

OBJECT OF THE SOCIETY.

The object of this Society shall be to improve the condition of pomology, horticulture and arboriculture, by collecting and disseminating correct information concerning the culture of such fruits, flowers, trees, and other productions in horticulture as are adapted to the soil and climate of Minnesota.

ARTICLE III.

MEMBERSHIP.

Any person may become a member by paying to the secretary or treasurer an annual fee of one dollar, or a life member by the payment of ten dollars, provided that life members may pay the fee of ten dollars in two equal annual payments of five dollars each.

Local or county horticultural societies and kindred organizations may become auxiliary to this Society, and their members

entitled to all the rights and privileges of membership by sending three delegates, furnishing a list of members and a report of the proceedings thereof to this Society at its annual winter meeting.

Honorary members, for a time stated or for life, may be elected at any annual meeting by a two-thirds vote of the Society.

ARTICLE IV.

OFFICERS.

Its officers shall consist of a president and one vice president from each congressional district, a secretary, treasurer, and an executive committee of five, and librarian.

ARTICLE V.

DUTIES OF PRESIDENT AND VICE PRESIDENTS.

The president shall preside at and conduct all meetings of the Society, and deliver an annual address, and in his absence the vice presidents, in their order, shall perform the same duties. They shall also have a general supervision of the horticultural interests in their respective districts, and make a written report to the Society at its annual winter meeting; in consideration of which the Society shall pay their traveling expenses to the same.

ARTICLE VI.

THE SECRETARY.

The secretary shall record all the doings of the Society, collate and prepare all communications, etc., for the public press, and pay over all moneys received from members or otherwise to the treasurer on his receipt; receive and answer all communications addressed to the secretary, establish and maintain correspondence with all local, county, district and state horticultural societies, and secure by exchange their transactions, as far as possible; to aid the president as an executive officer in the dispatch of business relating to the meetings of the Society, notices of horticultural and similar meetings of general interest, and report to the annual meeting of the Society an abstract of the matter that has come into his possession, which, with its approval, shall become part of its transactions of the current year.

ARTICLE VII.

THE TREASURER.

The treasurer shall collect and hold all funds of the Society, and pay out the same only on the order of the president, countersigned by the secretary. He shall make up a report of all the receipts and disbursements of the Society and present the same at the annual winter meeting, or any other time when called upon to do so by the executive committee. He shall give bonds in such sums as the Society may direct, to be approved by the president and secretary, and the bond when so approved shall be filed with the state auditor.

ARTICLE VIII.

ELECTION OF OFFICERS.

The officers shall be elected separately and annually by ballot, and hold their offices until their successors are elected.

ARTICLE IX.

MEETINGS OF THE SOCIETY.

The Society shall hold annual sessions on the third Tuesday of January, and other meetings at such time and place as the Society may direct.

ARTICLE X.

THE LIBRARIAN.

The librarian shall have charge of the library and report its condition at each annual meeting.

ARTICLE XI.

AMENDMENTS.

By-laws and alterations of the constitution for the purpose of meeting the future wants of the Society, may be enacted by a vote of two-thirds of the members present at any regular annual meeting, and on one day's notice of the same being given.

BY-LAWS.

1. The president, at each annual meeting of the Society shall appoint a general fruit committee, consisting of two members from each congressional district in the state, and it shall be the duty of each member to make a written report annually upon the fruit crop, and a limited list of fruits best adapted for general cultivation in their respective districts.

2. The president, secretary and treasurer shall be members *ex-officio* of the executive committee, who shall have charge of all matters pertaining to the interest of the Society.

3. The executive committee may call a meeting of the Society at any time they may deem advisable, giving at least thirty days' notice through the public press.

4. The executive committee shall appoint a committee on seedlings, on nomenclature, on forestry, on fruit blossoms, on Russian apples, on gardening, on small fruits and on floriculture.

5. The five members of the executive committee, not including the president, secretary or treasurer, shall be a committee on finance, and it shall be their duty to audit all bills before they shall be ordered paid by the president and secretary.

6. The executive committee shall see that a program is issued for each meeting of the Society, at least one month before the winter meeting and ten days before the summer meeting.

7. Every member shall be entitled to one copy of the transactions as often as published, on which postage shall be paid; but in distribution of all other copies the party receiving the same shall pay the postage. Where several copies are sent to auxiliary societies it shall be discretionary with the secretary to pay the freight.

8. *Quorum.*—A quorum shall consist of nine members of the Society, or a majority of the executive committee.

MINNESOTA

STATE HORTICULTURAL SOCIETY.

TRANSACTIONS OF 1888-9.

THE SUMMER MEETING, 1888.

NOTE.—The Society will not be held responsible for individual opinions which are found in this report.—*Secretary.*

The following is the circular issued by the Society, announcing the summer meeting, together with premium list:

The summer meeting of the Society will be held on the grounds of the state experimental farm, situated nearly midway between St. Paul and Minneapolis, one mile north of St. Anthony Park and near the state fair grounds, Thursday, June 28th, to be followed (the weather being pleasant) by a horticultural excursion to Lake Minnetonka on the following day.

The meeting at the experimental farm will be on the basket picnic plan, to which all are expected to contribute.

The program will be somewhat informal, although of an interesting nature. The object lessons of the day will be well worth the time and expense incurred to everyone having an interest in the beautifying of the home and its surroundings.

The new buildings recently erected at the farm, by the board of regents of the State University, possess some new and novel features, affording increased facilities for teaching the higher branches of experimental work, the principles of agriculture, horticulture, etc.

A review of the experimental work will be given by the superintendent of the farm, Prof. Edward D. Porter, showing the progress made since we met there two years ago.

Prof. Lugger will give a short address on insects injurious to farmers and horticulturists, illustrated by specimens.

Prof. Green will have something to say of interest to gardeners, florists, and small fruit growers. This will be followed by a brief discussion on topics of interest.

The three-year-old orchard of New Russians will be examined, affording an opportunity for observing the character of trees and their adaptability for withstanding the severity of our trying northwestern climate; also many other features of experimental work conducted at the state experimental station.

Liberal premiums are offered and it is expected that exhibitors will be prompt and place all their exhibits on the tables by ten o'clock A. M., so the judges to be appointed can make awards and report thereon by twelve o'clock. After the awards have been made the strawberries on exhibition will be appropriated for the purposes of the basket picnic, to be served at one o'clock. This will not be the least attractive feature on the program.

It is hoped there may be a full attendance of members as well as others interested in horticulture, agriculture, and in the experimental work now being conducted at the farm. The ladies are very cordially invited to be present and to participate in the exercises of the day. Amateur horticulturists, both young ladies and gentlemen, are also invited.

The location of the farm is convenient to both St. Paul and Minneapolis, frequent trains being run between the cities and St. Anthony Park, over the Manitoba and St. Louis railways. Conveyances will be provided up to eleven o'clock for the transportation of delegates from the station to the farm.

Entertainment will be provided for delegates in attendance from a distance.

EXCURSION TO MINNETONKA.

Arrangements are being made by the local committee for an excursion to Lake Minnetonka on Friday, June 29th, when an opportunity will be afforded for visiting some of the vineyards and nurseries in the vicinity, including a sail upon the beautiful lake.

For further particulars address

S. D. HILLMAN,
Secretary, Minneapolis.

WYMAN ELLIOT,
President, Minneapolis.

PREMIUM LIST.

Prof. E. D. Porter, Superintendent of Exhibits.

STRAWBERRIES.

	First Prem.	Second Prem.
Best general collection of not less than five named varieties, one pint each	$5 00	$3 00
Best four varieties, one quart each	3 00	2 00
Best Minnesota Seedling, not before exhibited	3 00	2 00
Best quart Wilson's Albany	2 00	1 00
Best quart Countess	2 00	1 00
Best quart Charles Downing	2 00	1 00
Best quart Crescent Seedling	2 00	1 00
Best quart James Vick	2 00	1 00
Best quart Manchester	2 00	1 00
Best quart Glendale	2 00	1 00
Best quart Prince of Berries	2 00	1 00
Best quart Sharpless	2 00	1 00
Best quart Windsor Chief	2 00	1 00
Best quart Seth Boyden	2 00	1 00
Best quart Green Prolific	2 00	1 00
Best quart Capt. Jack	2 00	1 00
Best quart Col. Cheney	2 00	1 00
Best quart Daniel Boone	2 00	1 00
Best quart Kentucky Seedling	2 00	1 00
Best quart Old Ironclad	2 00	1 00
Best quart Cumberland Triumph	2 00	1 00
Best quart Minnetonka Chief	2 00	1 00
Largest fruit of any variety	2 00	1 00

The same premiums may be awarded upon other varieties of equal merit.

VEGETABLES.

	First Prem.	Second Prem.
Best collection, not less than six varieties, grown by exhibitor...	$5 00	$3 00
Best 3 bunches of asparagus	1 00	50
Best 6 beets	1 00	50
Best 6 carrots	1 00	50
Best 6 onions	1 00	50
Best 6 radishes	1 00	50
Best 6 turnips	1 00	50
Best 6 stalks pieplant	1 00	50
Best 6 heads lettuce	1 00	50
Best 3 heads of cabbage	1 00	50
Best 3 heads of cauliflower	1 00	50
Best ½ peck of green peas	1 00	50
Best ½ peck string beans	1 00	50
Best ½ peck new potatoes	1 00	50
Best 6 cucumbers	1 00	50
Best 6 summer squash	1 00	50

FLOWERS.

	First Prem.	Second Prem.
Best collection cut flowers	$5 00	$3 00
Best collection roses	5 00	3 00
Best collection pansies	3 00	2 00
Best hand bouquet	2 00	1 00

RULES.

The awarding committee shall close their labor, and report to the Society at twelve o'clock, M. They shall have power to recommend special premiums for seedlings, and articles of special merit, not provided for in the schedule of premiums. They shall not award premiums to contributions unworthy of exhibition, even if there is no competition.

Competition shall be open to all, but the annual membership fee of one dollar will be deducted from premiums awarded to persons who are not members of the Society.

PROCEEDINGS AT THE SUMMER MEETING.

THURSDAY, JUNE 28, 1888.

Pursuant to notice the summer meeting of the State Horticultural Society was held at the state experimental farm, Thursday, June 28, 1888. The day was perfect in every respect, and the attendance of delegates and members of the Society was quite large. The exhibits made of fruits, flowers and vegetables were unusually fine and the premiums awarded were larger than usual.

President Elliot announced the following committees:

On Flowers: Prof. Samuel B. Green, St. Anthony Park; Mrs. H. A. Kellam and Mrs. F. L. Moffett, Hamline.

On Fruits: J. S. Harris, La Crescent; J. W. Boxell, St. Paul, and Isaac Gilpatrick, Minneapolis.

On Vegetables: J. T. Grimes, Minneapolis; J. M. Underwood, Lake City, and F. G. Gould, Excelsior.

The forenoon was spent in arranging exhibits, social intercourse and examining the various object of interest at the experimental farm.

The following award of premiums was made:

AWARD OF PREMIUMS.

FRUITS.

Best general collection of strawberries of not less than five named varieties, Early Princess, Crescent, Capt. Jack, Kramer's No. 2.

	Premium.	Amount.
Foundling, J. C. Kramer, La Crescent	First	$5 00
Best four varieties Jewell, Wilson, Champion, Capt. Jack, J. Allyn, Red Wing	First	3 00
Best four varieties Crescent, Manchester, Wilson, Jessie, N. J. Stubbs, Long Lake	Second	2 00

	Premium.	Amount.
Best Minnesota Seedling, not before exhibited, M. Cutler, Sumter	First	$3 00
Best quart Wilson, N. J. Stubbs, Long Lake	First	2 00
Best quart Wilson, Mrs. Anna B. Underwood, Lake City	Second	1 00
Best quart Countess, Mrs. Anna B. Underwood, Lake City	First	2 00
Best quart Crescent, J. C. Kramer, La Crescent	First	2 00
Best quart Crescent, M. Cutler, Sumter	Second	1 00
Best quart James Vick, Mrs. Anna B. Underwood, Lake City	First	2 00
Best quart Manchester, N. J. Stubbs, Long Lake	First	2 00
Best quart Glendale, N. J. Stubbs, Long Lake	First	2 00
Best quart Early Princess, J. C. Kramer, La Crescent	First	2 00
Best quart Sharpless, Mrs. Anna B. Underwood, Lake City	First	2 00
Best quart Windsor Chief, Wm. Lyons, Minneapolis	First	2 00
Best quart Windsor Chief, N. J. Stubbs, Long Lake	Second	1 00
Best quart Capt. Jack, J. C. Kramer, La Crescent	First	2 00
Best quart Capt. Jack, N. J. Stubbs, Long Lake	Second	1 00
Best quart Ironclad, N. J. Stubbs, Long Lake	First	2 00
Best quart Ironclad, Wm. Lyons, Minneapolis	Second	1 00
Best quart Cumberland, C. L. Smith, Minneapolis	First	2 00
Best quart Cumberland, Wm. Lyons, Minneapolis	Second	1 00
Best quart Jessie, N. J. Stubbs, Long Lake	First	2 00
Best quart Jessie, S. R. Spates, Excelsior	Second	1 00
Best quart Jewell, S. R. Spates, Excelsior	First	2 00
Best quart Jewell, Mrs. Anna B. Underwood, Lake City	Second	1 00
Best quart May King, Wm. Lyons, Minneapolis	First	2 00
Best quart Lyons' Seedling, Wm. Lyons, Minneapolis	First	2 00
Largest berry, Jessie, N. J. Stubbs, Long Lake	First	2 00
Largest berry, Early Princess, J. C. Kramer, La Crescent	Second	1 00
Currants, Fay's Prolific, J. F. Gilmore, Richfield	First	3 00
Currants, Fay's Prolific, W. H. Brimhall, Hamline	Second	1 00
Gooseberries, Houghton, J. F. Gilmore, Richfield	First	2 00
Gooseberries, Hixon, J. F. Gilmore, Richfield	Second	1 00

CUT FLOWERS.

	Premium.	Amount.
Best collection, Miss Julia Lyons, Minneapolis	First	$5 00
Best collection, Mrs. W. G. Hendrickson, Hamline	Second	3 00
Best collection of roses, Mrs. M. G. Gould, Excelsior	First	5 00
Best collection of roses, Mrs. Anna B. Underwood, Lake City	Second	3 00
Best collection pansies, J. S. Gray, Minneapolis	First	3 00
Best collection pansies, Miss Julia Lyons, Minneapolis	Second	2 00
Best hand bouquet, Miss Julia Lyons, Minneapolis	First	2 00
Best hand bouquet, Mrs. R. Pearse, Minneapolis	Second	1 00

VEGETABLES.

	Premium.	Amount
Best collection, William Lyons, Minneapolis	First	$5 00
Best collection, J. Allyn, Red Wing	Second	3 00
Asparagus, William Lyons, Minneapolis	First	1 00

	Premium.	Amount.
Asparagus, William McIntosh, Langdon	Second	$ 50
Beets, J. S. Gray, Minneapolis	First	1 00
Beets, J. Allyn, Red Wing	Second	50
Onions, J. Allyn, Red Wing	First	1 00
Onions, J. S. Gray, Minneapolis	Second	50
Radishes, J. S. Gray, Minneapolis	First	1 00
Radishes, William Lyons, Minneapolis	Second	50
Pieplant, H. F. Busse, Minneapolis	First	1 00
Pieplant, William Lyons, Minneapolis	Second	50
Lettuce, J. S. Gray, Minneapolis	First	1 00
Lettuce, William Lyons, Minneapolis	Second	50
Peas, William Lyons, Minneapolis	First	1 00
Cucumbers, William Lyons, Minneapolis	First	1 00
Cucumbers, J. S. Gray	Second	50
Tomatoes (special), J. S. Gray, Minneapolis	First	2 00

After the awards were made, a picnic dinner was served, at which more than one hundred persons were present, both of ladies and gentlemen, and of old and young.

After dinner, President Elliot called the meeting to order, and an informal discussion was had with reference to visiting Lake Minnetonka the following day. It was decided to visit the lake.

President Elliot said that Prof. Green had been invited to address the Society briefly on horticultural topics.

REMARKS BY PROF. GREEN.

Members of the Minnesota Horticultural Society,

LADIES AND GENTLEMEN: I am glad of the opportunity of addressing you, because it gives me a chance of expressing my warmest sympathy and admiration for the work which has been and is being done by your Society. And is it to such societies as this, in connection with experiment stations, that the horticulturists of the state must look for their encouragement and profit.

Minnesota can not look to other states for precedents in horticulture. She must have a system of horticulture of her own. It must be developed on her own soil, and be built up by the laborious and practical methods of careful experimenting, trial, observation, and comparison.

As I have traveled over your state (and it is my state now), I have, as would any enthusiastic lover of horticulture, been struck not so much by the lack of development of commercial

horticulture, as by the lack of the cultivation of farm horticulture, among the farmers of the state. Most of the farmers appear to be sadly deficient in this grand practice which conduces in a very great degree to the health, economy and general happiness of the cultivators of the soil.

There is evidently too great a tendency among our farmers generally to specialize their efforts on the wheat crop. I believe heartily in the necessity for a closer cultivation of less land in a better way than is now practiced, and that to a mixed husbandry the farmers of Minnesota must look for success. It would be foolish for me to suggest that every farmer in the state go into commercial horticulture, nor would I have it so; but I would have every farmer, whether he cultivated few acres or many, have a first class, productive garden; and by care and foresight this can be had in any section of the state.

The absence of the garden is often due to a lack of information as to the best methods of procedure, and not knowing how, or when to start. But we may attribute the lack of gardens, principally, to a deficiency in information regarding their usefulness, profit and importance, and to a maximum and exaggerated knowledge of the care, worry and disappointment connected therewith.

And right here I want to speak a good word for the institute work, in which your state is a pioneer. I have had an opportunity of seeing the work in practice, and I believe it is the best work ever undertaken by any state to educate her farmers; and while I do not set up for a prophet, I want to prophesy that in the near future this work will be greatly increased, and as the farmers become better acquainted with its benefits to them, they will demand and have more of these institutes, and enlarged appropriations will be made for their support. These institutes offer the very best means of reaching the people, and impressing upon them the necessity of giving more attention to horticulture, and for disseminating throughout the state information on horticultural topics. I am a thorough believer in the institutes for the farmers, and in the farm school recently established at this station for the farmers' sons.

I am glad of this opportunity of expressing my views as to the relation which I hope the horticultural department of the experiment station will sustain to your Society. I want to make the horticultural department the best department of the station and a representative department; to get close down to the work

and make it practical, earnest and aggressive. I desire that Minnesota shall have the best horticultural department in the country—second to none—and I want you, ladies and gentlemen, and all friends of horticulture, to feel and believe that I am anxious for your earnest co-operation and helpfulness in pushing the good work. This horticultural department is for you, and the horticulturist in charge considers himself your servant, and is desirous of doing all he can to promote your interests. I do not expect to perform miracles; but I do expect by careful working, trying, and comparison of one season with another, to advance methods in the interest of economy, comfort and general usefulness.

As there are scarcely any lands that are alike in all particulars, and as every locality has its special climate and is best adapted for its appropriate line of work, by reason of markets, climate or soil, so to some extent must every progressive horticulturist and farmer be an experimenter and his lands must be experimental lands. I believe this thoroughly and mean to encourage individual experiments. It is evident to those acquainted with the work that much can be done by a central station to direct and stimulate experiments, and also in collecting and arranging information concerning them.

Besides this work I believe that it is the duty of the experiment station to carry on any experiments of general interest to the agricultural community which comes within its province, especially those which, from the expense incident thereto, or from the need of peculiar facilities or training, will not be undertaken by individuals.

I shall be glad to have suggestions made by those interested in horticultural matters as to the best lines of work to pursue for the most useful results, and at any time to have my attention called to any promising novelty, or any new feature in the use of any variety for a special purpose, or to special methods of cultivation.

Dr. Otto Lugger was then called upon for some remarks, and responded briefly.

REMARKS OF DR. LUGGER.

Dr. Lugger said he had but recently returned from a trip in the northern portion of the state, where he had been busy investigating the reported visitation of the grasshoppers; he was

not prepared to make any extended remarks at this time. He might, however, refer to the importance of knowing the proper methods of fighting our enemies, the noxious insects. There were two methods of destroying them, the natural and the artificial.

Insects did not come and spread over very large fields without being favored by certain conditions, such as climatic influences, a lack of enemies, or by the present method of growing as much as possible one kind of food. When, for instance, we cultivate nothing but wheat, the Hessian fly and chinch bug increase beyond measure. If we grow nothing but potatoes the potato beetles increase inordinately. Among the natural remedies were to be included our friends, carnivorous beetles and parasitic wasps, both valuable for the destruction of other insects.

He had noticed near Perham the week before a species of dragon fly that seemed to be making attacks upon the grasshoppers.

Every farmer should study this subject of entomology and be able to recognize his friends at once among the insect species.

Insects could be destroyed by the use of coal oil, Paris green, and other insecticides, but the most important thing, perhaps, was the matter of co-operation; farmers should come together and fight them in a concerted manner.

President Elliot. We have with us another gentleman that has had a great deal of experience in the way of landscape gardening. I refer to Prof. Cleveland, and will ask him to favor us with just a few remarks this afternoon.

REMARKS BY PROF. H. W. S. CLEVELAND.

LADIES AND GENTLEMEN: This is entirely unexpected to me, but I feel that I have some right to speak to a horticultural society by virtue of former occupations.

I was for many years engaged especially in fruit culture in the State of New Jersey. I took a very active part, more than forty years ago, in organizing the New Jersey Horticultural Society, of which I was the secretary for a great many years. I was also a member of the Pennsylvania State Horticultural Society.

It is many years, however, since then, or since I have had much practical experience with horticulture. I have been between thirty and forty years engaged in my profession of landscape gardening. For five years past I have been endeavoring

to do what I might to develop the natural beauties of these two cities of St. Paul and Minneapolis.

I feel that in these two cities there are such opportunities as no other cities in the country possess for the development of beauty and for the making of cities which shall be the fitting abode of a noble race of men and women, and I hope, and it is my wish, that I may be enabled to devote my remaining years to those objects.

I have no wish to enlarge upon my own experience now. What I do wish to speak of is one point in which every practical horticulturist is specially interested in and mutually so. You can not develop an ideal interest in these subjects in the people until you can have these principles hammered into them by repeated and constant urging; and I say, and insist from my own experience, and from what I see, that it is exceedingly difficult to induce any of the papers in these two cities to show any earnest interest in the matter. You seldom see anything more than a mere incidental allusion to such efforts as you are making here, and to such efforts as I am making to develop the natural beauty of the place. But we find in our daily papers column after column devoted to base ball, and recently the paper informs you that there were 3,000 people out to witness a couple of men who were trying to maul each other in the prize ring. (Laughter and applause.)

Now, gentlemen, what I would urge upon you is to have discussions and to insist upon it that they be laid before the public. It can be done if we are interested in the promotion of horticulture and the promotion and development of the beauty of the country, and it is to be accomplished by bringing the subject constantly before the people, and showing them the benefits which are to be derived therefrom, and thus awaken popular interest and enthusiasm, which shall thus lead to the development you may desire.

Now, I might talk all the afternoon on different subjects connected with it, but I would impress upon you the importance of creating this popular interest in this work. And there is no means by which it can be done so readily as by constant discussion in the papers. (Applause.)

President Elliot. I think these remarks are very pertinent and they no doubt express the sentiments of every true horticulturist here present.

Prof. Porter was here invited to address the Society briefly as to the work being conducted at the experiment station.

REMARKS OF PROF. PORTER.

Prof. Porter said he congratulated the Society on the number present at this the summer meeting. It had been two years since they were there last. An opportunity is now afforded to see if any progress has been made.

Hitherto the work has been preparatory — the foundation to be laid, and our aim has been to lay these foundations so broad and deep that they will not be torn down, but a superstructure will be erected upon them that will be a credit to its founders, a benefit to the world and an honor to the state which has fostered it.

During the past five years you have seen at your annual meetings the gradual development of this work. From a farm of sand hills and peat bogs — without buildings, stock, implements, or machinery — you see a farm of two hundred and fifty acres of the finest land in Minnesota for our purposes, with a complete set of farm buildings; models of their kind, with the best specimens of blooded stock in the state; yards and pens, with a full supply of the most improved implements and machinery — with fields in the highest state of cultivation; nurseries and orchards, vineyards and gardens filled with every variety of tree, shrub, flower and fruit which is of value to Minnesota; you see an agricultural experiment station with its full equipment of laboratories, library, office, instruments and scientific men, with its work fully organized and in operation.

From time to time, for three years past, I have outlined to you, my plans for a farmers' school — a school where a farmer boy, coming directly from his home school, may find facilities for acquiring a knowledge of such branches of study as will qualify him for the successful prosecution of his calling as a farmer, or a citizen, and at the same time keep up his association with farm life — preparing him to go back to the farm, instead of going away from it. I have been working persistently for the establishment of this school, and after convincing our authorities of the feasibility of the plan, the next difficulty to be overcome was to find funds to provide the necessary buildings and equipment. This was accomplished last fall, and on the summit of the hill overlooking Minneapolis, St. Paul, Hamline University and Macalester Col-

lege, you will find a most complete building, erected, furnished, and ready for the reception of students this fall, and I predict that before the close of winter every nook and corner of that building will be filled with bright, active, intelligent boys from the farms of Minnesota.

All the above work, the equipment of the farm, the organization of the station, and the development of the School of Agriculture, has been accomplished without a single dollar of direct appropriation from the state—all has been paid for from the sale of our old farm.

I invite you while here to make a careful inspection of our work, and give us your suggestions for the future. We are here as your agents, to do your work, and this work will be either a failure or a success, just in proportion as the farmers and horticulturists of the state take an interest in it.

I take pleasure in introducing to you Prof. Samuel B. Green, the horticulturist of the station, who has outlined to you the work which he has under way, and what he proposes for the future. Thanking you for your presence with us to-day, I hope you will annually favor us with a visit. (Applause.)

CORRESPONDENCE.

The Secretary read the following correspondence:

FERGUS FALLS, MINN., June 22, 1888.

S. D. Hillman, Secretary, etc.,

DEAR SIR: Thanks for your kind invitation to the summer meeting of the horticulturists. I expect to be in St. Paul on a short visit at that time, and shall make it a point, if possible, to get out to the experimental farm on the twenty-eighth and see the crowd. The sentence in the circular about "amateurs" just lets me in, for I'm probably the most amateurist amateur in that line that you'll have present.

I planted a box of celery this spring. It grew rapidly and I tended it with jealous care for six weeks, carrying it back and forth, watering, pulling weeds, etc. At the end of that time a friend who has raised celery, looked it over, and cheerfully told me that it was grass with which the box was filled! I had guarded the grass and weeded out the celery as fast as it appeared.

If this is enough to entitle me to admission among the *other* horticulturists, I'll be there probably.

Respectfully,

HARRY M. WHEELOCK.

FROM MICHIGAN.

SOUTH HAVEN, MICH., June 23, 1888.

S. D. Hillman, Secretary, etc.,

DEAR SIR: I am doubtless indebted to you for a copy of the program for your summer meeting to occur on Thursday of next week.

Were it not that duties at home render it impracticable, I would gladly be with you and would anticipate great pleasure in repeating my hasty visit with you to the grounds of your state farm, and observing the developments of another year.

The present season here has been very backward, at least two weeks later than usual. We are now not quite at the height of the strawberry shipping season; but the last few days have been moist and very warm, which is rapidly hastening vegetation.

The open weather and constant freezing and thawing of February, March and even April, also, to some extent, have rendered the strawberry crop a light one, but the peach crop (which is our most important one) is very heavy, requiring some thinning. Apples and other fruit crops generally are very promising. In my last season's visit to your state and Iowa, I was so pleased with what I saw of your recent varieties of native (*Americana*) plums that I arranged with Mr. Harris of your state and with Prof. Budd for trees of several of these which I now have growing finely, and I anticipate, with them, that we may be able to escape the ravages of the curculio, at least in part, together with certain other maladies which, for many years past, have rendered the culture of the domestic varieties with us in Southern Michigan unsuccessful, and, in the main, unprofitable.

Trusting that your gathering will prove both interesting and profitable, I am, Very truly yours,

T. T. LYON.

On motion the meeting then adjourned.

The following description of the meeting and of the trip to the lake the day following, from the pen of President Elliot, is given here:

THE SUMMER MEETING.

The annual summer meeting held June 28th, at the state experiment farm, St. Anthony Park, and the excursion the twenty-ninth, at Lake Minnetonka and its environs, was an occasion worthy of mention in the annals of this Society; one of the mile stones showing the advancement of interest, enterprise and energy manifested at this particularly busy season. To those not there to participate, we can hardly give suitable expression descriptive of the enthusiasm, joy and pleasure manifested by those present. At the experiment farm, the hearty and cordial reception given the members and their friends by Prof. Porter and his able corps of assistants, was by all appreciated. The fruits exhibited were the finest ever shown at a summer meeting; especially so were the strawberries; and particular mention should be made of the new seedlings from the grounds of Messrs. Wm. Lyons, of Richfield, and J. C. Kramer, of La Crescent; kinds that will be of great value to our farmers, gardeners and fruit growers.

Doubtless you have all heard of stories that were considered fishy, but the largest story in this direction is on great yields of strawberries recorded the past season. Mr. Kramer's new seedling, the Princess, which by actual measurement of ground and count of bushels, produced 825 bushels per acre, estimated by the square rod. This, however, is not quite up to the story told by an Eastern amateur horticulturist, of what he has accomplished with the Jessie, 43 quarts picked from 12 plants, or at the rate of 1,845 bushels per acre, the largest berry measuring 9¼ inches in circumference!

Awards of premiums being made the ladies present took possession of the fruit and prepared it for the table, which with the Jersey cream and cake contributed, made a very luxurious and

enjoyable repast. After dinner short speeches were made upon various topics by specialists in their particular lines of work. Prof. Porter uttered very enthusiastically the bright prespects of the new farm school which was to be started in October, and the flattering outlook for the future experiment work of the station. Prof. H. W. S. Cleaveland, the veteran landscapist, spoke as a devotee only can of the natural beauties of the country surrounding the twin cities of this great and beautiful state; the many beautiful homes, parks and driveways, that were each year being improved and embellished into graceful beauty and ornamentation, recommending more thought and consideration be given to æsthetic adornment by our citizens, rather than in encouraging prize fights and base ball contests.

Dr. Lugger having just returned from a very successful campaign against the grasshoppers in the northern part of the state gave us a "hopperish" kind of talk that was very amusing; he also outlined some of the prospective work in the entomological department of the station.

Prof. Green having just returned from work with the farmers institute, spoke of the great good that was being accomplished by the instruction that was being given to the farmers of our state; the teaching was very simple and plain and must of necessity bring in the near future grand results. Speeches were made by several prominent visitors and all felt well repaid for the visit, voting the exhibition a grand success; but like the wine spoken of in the Good Book, the best was kept until the second day of the feast.

The excursion to Lake Minnetonka the following day, was a new departure and very entertaining. The ride on the cars was first to Excelsior, where we were met by Bro. Gould. His beaming countenance was all aglow with the kind welcome he was prepared to extend from the citizens of that beautiful lakeside town, in their hospitable entertainment. Everything seemed to have been arranged to make this visit most enjoyable, and in our yearly gatherings to be a bright spot long to be remembered. The splendid field of hybrid, perpetual and June roses of Bro. Gould was a revelation to many of us in floriculture, few knowing that many of the kinds here grown out of doors were hardy enough for this climate. One of the instructive features of this visit was A. W. Latham's finely kept vineyard, where vine and fruit gave evidence of fine cultivation and care, and great promise of a fruitful harvest.

The excursion on the beautiful Lake Minnetonka by steamers to prominent points, was greatly enjoyed. We visited Lake Park Hotel and grounds, the La Fayette, Major George A. Camp's neatly kept fruit and flower garden, George Brackett's villa residence on Starvation Point and by a short walk came to Brother Stubbs' vineyard, orchard, strawberry, raspberry and blackberry patches, where were learned lessons of great interest to us all; and when this day of sight-seeing was closed all wished that it might have many happy returns.

MINNESOTA

STATE HORTICULTURAL SOCIETY.

TWENTY-SECOND ANNUAL MEETING

AT MARKET HALL, MINNEAPOLIS, TUESDAY, WEDNESDAY, THURSDAY AND FRIDAY, JAN. 15, 16, 17 AND 18, 1889, IN JOINT SESSION WITH STATE AMBER CANE ASSOCIATION.

Following is the circular sent out announcing the annual winter meeting of the Society:

The twenty-second annual meeting of the Minnesota State Horticultural Society will be held at Minneapolis, on January 15th to 18th inclusive, 1889, the State Amber Cane Association occupying the time of the afternoon of Wednesday for its twelfth annual session.

A cordial invitation is extended to kindred organizations in other states as well as to local societies, to send delegates to the meetings, which are *free* to all. Ladies especially are invited to attend; also, young ladies and gentlemen who desire to become better informed on horticultural topics, and to take part in the exercises and discussions.

Members of the Society, so far as possible, are urged to be present and to come to the meeting prepared to render personal assistance in making the session one of unusual profit and interest to all concerned. Come to the meeting and relate your experience with horticultural products in the past and your

views as to the safest and best methods of care and culture for the future. Give such hints or suggestions as may seem proper, as to methods of culture, character of your soil, protection and care, marketing of garden and farm products, etc., etc.; especially reporting your experience with any new varieties of vegetables, fruits or flowers. Thus by an interchange of ideas we hope to make sure and steady advancement in the really interesting and fascinating study of horticuiture in its various branches.

Fewer papers will be read than usual and more time given to discussion of topics of interest which may be brought before the meeting. The question box will be a leading feature. Reports will be expected, however, from members of special and standing committees, either orally or by manuscript; the same to be brief and to the point. This is important as indicating the progress being made in the cause from year to year throughout the state.

Liberal premiums will be given for exhibits of fruits, flowers, vegetables, etc., but not on inferior or unworthy articles, even if there is no competition. It is hoped a large and creditable exhibit may be made.

SPECIAL PREMIUMS FOR ESSAYS.

The Society again offers special prizes for essays by young men and women under twenty-five years of age, as follows: Best essay on "Orcharding in Minnesota," $25; best essay on "Grape Growing iu Minnesota," $25; best essay on "Strawberries and Raspberries in Minnesota," $25; best essay on "Blackberrries and Dewberries in Minnesota," $25; best essay on "Currants and Gooseberries in Minnesota," $25.

Parties should hand in their essays on or before ten o'clock on the morning of the second day in order that the committees on award may have ample time to examine the same carefully and make their report during the meeting. As this may be the last opportunity afforded—at least for some time to come—to obtain a prize of this nature and as it is offered as an incentive to awakened interest in horticulture among amateurs, it is hoped there may be earnest and generous rivalry displayed among our younger members.

It is expected the usual reduction in rates of fare to delegates will be obtained from the various lines of railway in this state. Delegates on purchasing a full fare ticket going should at the

same time secure from the agent a delegate's convention receipt, specifying that such ticket has been purchased, in order that the Secretary may properly indorse the same for the return trip.

Members in attendance from a distance will be provided with entertainment by the local committee on arrangements.

For further particulars, address

S. D. HILLMAN,
Secretary, Minneapolis.
State Horticultural Society.

WYMAN ELLIOT,
President, Minneapolis.

PROF. E. D. PORTER.
Secretary, St. Anthony Park.
State Amber Cane Association.

RUSSELL BLAKELEY,
President, St. Paul.

PROGRAM.

The following order will be subject to change from time to time as the Executive Committee or the Society may deem best.

FIRST DAY.—TUESDAY, JANUARY 15.

10 A. M. Opening Exercises. Arrangement of Exhibits and Reception of members.

Appointment of Committees. Committee on Fruit List; on Award of Premiums; on Prize Essays; on Publication; on Final Resolutions; on Obituary.

AFTERNOON SESSION.

2 P. M. Address of Welcome. Col. J. H. Stevens, Minneapolis.

Response to Address of Welcome. A. W. Sias, Rochester.

Reports from Local Societies. Hennepin county Horticultural Society, Prof. L. Asire, secretary, Minneapolis; Southern Minnesota Horticultural Society, A. W. Sias, president, Rochester; Minnesota Valley Horticultural Society, O. E. Saunders, president, Granite Falls; Lake Side Horticultural Society, S. Y. Gordon, Jr., Browns Valley; McLeod county Horticultural Society, H. I. Corson, secretary, Glencoe; Ramsey County Agricultural and Horticultural Society, E. A. Venzke, secretary, St. Paul; Southwestern Horticultural Society, Edwin Rodgers, secretary, Mankato.

Correspondence, etc.

Discussion.

Question Box.

EVENING SESSION.

7 P. M. President's Annual Address. Wyman Elliot, Minneapolis.

Minnesota Law on Nursery Frauds. M. Cutler, Sumter.

Discussion.

SECOND DAY.—WEDNESDAY, JANUARY 16.

9 A. M. Report of Seedling Commission. John S. Harris, La Crescent; G. W. Fuller, Litchfield; A. W. Sias, Rochester.
Wild Fruit of Minnesota. Col. J. H. Stevens, Minneapolis.
Report of Committee on Native Fruits. O. M. Lord, Minnesota City.
Russian Fruits. Prof. J. L. Budd, Ames, Iowa.
Report of Committee on Russian Apples. Chas. Luedloff, Carver.
Discussion.
Winter Gardening J. S. Gray, Minneapolis.

AFTERNOON SESSION.

2 P. M. Twelfth Annual Meeting of State Amber Cane Association.

PROGRAM.

Minutes of Last Meeting.
Reception of Members.
Report of Secretary and Treasurer.
Election of officers.
Appointment of Committees.
President's Address. Russell Blakeley, St. Paul.
Present Condition of the Amber Cane Industry. Seth H. Kenney, Morristown.
Reports from Growers and Manufacturing of Amber Cane.
Apiary Culture. William Urie, Minneapolis.
Discussion.

EVENING SESSION.

7 P. M. Question Box.
Lecture by Dr. Otto Lugger, of State Experiment Station, on Carniverous Plants. Illustrated.

THIRD DAY.—THURSDAY, JANUARY 17.

9 A. M. Annual Report of Secretary.
Annual Report of Treasurer.
Annnal Report of Librarian.
Horticulture in Dakota. Prof. C. A. Keffer, Brookings, Dakota.
The Culture of Small Fruit. L. H. Wilcox, Hastings.
Report of Committee on Small Fruits.
Discussion.
Culture of Dewberry. J. H. Ludlow, Worthington.
Five Minute Papers on Vegetables. By Practical Gardeners.
Early Potatoes. Joshua Allen, Red Wing.
Report of Finance Committee.

AFTERNOON SESSION.

2 P. M. Ad Interim or District Reports. By vice presidents of the Society. A. W. Sias, Rochester; E. H. S. Dartt, Owatonna; M. Cutler, Sumter; N. J. Stubbs, Long Lake; G. W. Fuller, Litchfield.

Annual Election of Officers. By ballot.

Climatology of Minnesota and the Northwest. Col. D. A. Robertson, St. Paul.

Report of Committee on Evergreens.

Report of Committee on Forestry.

Discussion.

EVENING SESSION.

7 P. M. Education as Related to Horticulture. Prof. S. B. Green, St. Anthony Park.

Ethics of Horticulture. Mrs. Vie H. Campbell, Evansville, Wis.

Report of Committee on Floriculture. Mrs. C. O. Van Cleve, Minneapolis.

Roses. Mrs. Anna B. Underwood, Lake City.

Care and Culture of Bulbs. Frank H. Carleton, Minneapolis.

Entomologist's Report. Prof. O. W. Oestlund, Minneapolis.

Agricultural and Horticultural Education in Minnesota. Prof. W. W. Pendergast, St. Anthony Park.

FOURTH DAY.—FRIDAY, JANUARY 18.

9 A. M. Orchard Protection; Theory and Fact. E. H. S. Dartt, Owatonna.

Reports from Experimental Stations:

PROF. E. D. PORTER, St. Anthony Park.
E. H. S. DARTT, Owatonna.
J. S. HARRIS, La Crescent.
O. M. LORD, Minnesota City.
UNDERWOOD & EMERY, Lake City.
A. W. SIAS, Rochester.
O. F. BRAND, Faribault.
M. PEARSE, Minneapolis.
G. W. FULLER, Litchfield.
R. M. PROBSTFIELD, Moorhead.
ANDREW PETERSON, Waconia.
CHARLES LUEDLOFF, Carver.
B. TAYLOR, Forestville.
FRED VON BAUMBACH, Alexandria.
L. E. DAY, Farmington.
PETER M. GIDEON, Excelsior.

Report of General Fruit Committee:

SIDNEY CORP, Hammond.
D. K. MICHENOR, Etna.
J. C. KRAMER, La Crescent.

O. E. SAUNDERS, Granite Falls.
O. F. NORWOOD, Balaton.
M. C. BUNNELL, Newport.
N. J. STUBBS, Long Lake.
WILLIAM MCHENRY, St. Charles.
O. M. LORD, Minnesota City.
CLARENCE WEDGE, Albert Lea.
GEORGE E. CASE, St. Peter.
M. CUTLER, Sumter.
G. W. FULLER, Litchfield.
L. E. DAY, Farmington.
CHARLES LUEDLOFF, Carver.
W. H. BRIMHALL, Hamline.
J. H. LUDLOW, Worthington.

Discussion.
Native Plums. O. M. Lord, Minnesota City.
Report of Special Fruit Committee on Fruit Lists, and Revision of same.
Report of Committee on Award of Premiums.
Report of Committee on Nomenclature.

AFTERNOON SESSION.

2 P. M. Advantage of Forestry. J. O. Barrett, Browns Valley.
Report of Special Committees.
Report of Committee on Legislation. Prof. E. D. Porter, St. Anthony Park.
Report of Committee on Final Resolutions.
Place of Next Meeting.
Miscellaneous Business.
Final Adjournment.

PREMIUM LIST.

W. H. BRIMHALL, HAMLINE, Superintendent of Exhibits.

APPLES.

[All plates to consist of five specimens.]

Best collection of Minnesota Apples, including hybrids, first premium, $5; second, $3; third, $2.
Best display of Wealthy, first premium, $3; second, $2; third, $1.
Best plate of winter apples, any variety, first premium, $2; second, $1.
Best plate winter varieties Russian apples, first premium, $2; second, $1.

GRAPES.

Best display of native grapes, in good condition, first premium, $5; second, $3; third, $2.
Best plate, any variety, first, $3; second, $2.
Best display of fruit in glass jars, first premium, $5; second, $3.

PLANTS AND FLOWERS.

	1st Prem.	2d Prem.
Best display ornamental and flowering plants	$5 00	$3 00
Best display of roses in pots	2 00	1 00
Best display of geraniums	2 00	1 00
Best display single plant in bloom	2 00	1 00
Best display begonias	2 00	1 00
Best display carnations	2 00	1 00

CUT FLOWERS.

Best and most artistically arranged design, first premium, $5; second, $3.
Best collection of roses, first premium, $3; second, $2.
Best hand bouquet, first premium, $3; second, $2.
Best cultivated cranberries, provided a history of their cultivation be furnished, first premium, $5; second, $3.

VEGETABLES.

Best display	$5 00	$3 00
Best half peck early potatoes	2 00	1 00
Best half peck potatoes for winter and spring	2 00	1 00
Best half peck onions	2 00	1 00
Best half peck turnips	2 00	1 00
Best half peck beets	1 00	50
Best half peck parsnips	1 00	50
Best half peck carrots	1 00	50
Best Hubbard squash	1 00	50
Best six bunches celery	1 00	50
Best winter cabbage	1 00	50
Best winter lettuce	1 00	50

PANTRY STORES.

Best display canned fruits, $3; second best, $2.
Best display of jellies, $2; second best, $1.
Best jar mixed pickles, $1; second best, 50 cents.
Best sample home-made vinegar, $1; second best, 50 cents.
Best sample comb honey, $2; second best, $1.
Best sample strained honey, $1; second best, 50 cents.

WORKS OF ART.

Collection of paintings, fruits and flowers, first premium $5; second, $3.
Best single fruit painting, $3; second best, $2.
Display garden tools and horticultural implements, certificate of honorable mention.

Exhibitors are expected to make their entries the first day. All exhibits must be in place by ten o'clock A. M. the second day.

Competition shall be open to all, but it is expected that the annual membership fee ($1) will be contributed unless exhibitors are members of the Society. All members are entitled to bound copies of the transactions.

MINNESOTA

STATE HORTICULTURAL SOCIETY.

ANNUAL WINTER MEETING.

HELD AT MARKET HALL, MINNEAPOLIS, TUESDAY, WEDNESDAY, THURSDAY AND FRIDAY, JANUARY 15, 16, 17 AND 18, 1889, IN JOINT SESSION WITH STATE AMBER CANE ASSOCIATION.

The twenty-second annual winter meeting of the State Horticultural Society, held at Market hall, Minneapolis, convened on Tuesday morning, Jan. 15, 1889. The meeting was called to order shortly after ten o'clock, by the President, Wyman Elliot, of Minneapolis.

Prayer was offered by Rev. Frank P. Woodbury, D. D., pastor of the Park Avenue Congregational church.

President Elliot appointed the following committees, to-wit:

Committee on Award of Premiums: J. T. Grimes, Minneapolis; J. S. Harris, La Crescent; Mrs. V. H. Campbell, Evansville, Wis.

Committee on Fruit Lists: E. H. S. Dartt, Owatonna; J. M. Underwood, Lake City; A. W. Sias, Rochester.

Committee on Final Resolutions: J. O. Barrett, Browns Valley; Col. John H. Stevens, Minneapolis; Alfred Terry, Slayton.

Committee on Program: O. F. Brand, Faribault; Prof. W. H. Ragan, Greencastle, Ind.; C. L. Smith, Minneapolis.

Committee on Publication: President Wyman Elliot, Minneapolis; Col J. H. Stevens, Minneapolis; S. D. Hillman, Minneapolis.

Committees on award for Prize Essays: On Orcharding in Minnesota: J. T. Grimes, Minneapolis; B. Taylor, Forestville; J. M. Underwood, Lake City.

On Grape Growing in Minnesota: J. S. Harris, La Crescent; F. G. Gould, Excelsior; Isaac Gilpatrick, Minneapolis.

On Strawberries and Raspberries in Minnesota: H. W. Stedman, Rochester; Mrs. V. H. Campbell, Evansville, Wis.; M. Cutler, Sumter.

On Blackberries and Dewberries: A. J. Philips, West Salem, Wis.; N. J. Stubbs, Long Lake; L. H. Wilcox, Hastings.

On Currants and Gooseberries: O. F. Brand, Faribault; Elmer Reeves, Waverly, Iowa; C. L. Smith, Minneapolis.

The balance of the forenoon was taken up with the arrangement of exhibits, etc.

The meeting adjourned until two o'clock P. M.

AFTERNOON SESSION.

TUESDAY, JAN. 15, 1889.

The meeting was called to order by President Elliot at two o'clock, P. M.

There was a goodly attendance of delegates and members present at the opening sesson in the afternoon, and among the number from a distance were, Prof. W. H. Ragan, of Greencastle, Ind., secretary of the American Horticultural Society; Mrs. Vie H. Campbell, Evansville, Wis.; A. J. Philips, West Salem, Wis.; and E. Reeves, Waverly, Iowa.

An unusually fine exhibit of cut flowers and exotic plants was made by the Mendenhall greenhouse. There was a large and fine exhibit of fruit, especially of apples and grapes; also honey, syrup and pantry stores. The exhibit of vegetables was large and made a very creditable display.

ADDRESS OF WELCOME.

Col. John H. Stevens, of Minneapolis, being called upon, came forward and delivered the following address of welcome:

Ladies and Gentlemen of the State Horticultural Society:

In behalf of the citizens of Minneapolis, I bid you a warm, hearty welcome to the city you have honored with your presence. They sympathize with you in your endeavors to forward the interests of Horticulture in this state. They appreciate your efforts in making their homes more pleasant and beautiful with lovely flowers, valuable plants, choice shrubbery and trees for ornamental purposes, and desirable fruits and other necessary articles for their tables; realizing that no fireside can be happy and healthy in their absence. They are patrons of the fruit of your labor. They are fully alive to the importance of the great work you have undertaken. They are desirous of lending you a helping hand in every possible way, so that your efforts may be successful. They feel under deep obligations to you for the selection of this city for the holding of your twenty-second annual meeting. Their doors are opened and their homes are at your disposal during your deliberations. They ask each of you to become their guests while in attendance at this meeting.

RESPONSE TO THE ADDRESS OF WELCOME.

A. W. Sias, of Rochester, responded on behalf of the Society. He said:

Mr. President, Ladies and Gentlemen:

Permit me, on behalf of the State Horticultural Society, to heartily thank the good people of Minneapolis for this cordial welcome. This Society reminds me very forcibly of Hiawatha, when wooing his dusky bride, in what is now one of the charming suburbs of this city. You will recall to mind the fact, that the great poet, H. W. Longfellow, who immortalized the name of Minnehaha, Laughing Water, informs us that Hiawatha—

> "Lingered long about the doorway,
> Looking back as he departed."

And just so it is with this Society; we "linger long about the doorways" of this kind and hospitable people. Let it be understood, however, that we use the term hospitable in a restrictive sense, as we are no longer strangers in this beautiful city, for be it known that the very man who christened it, and gave it such a charming name, "combining the Greek and Indian tongue," was our second president, Mr. Charles Hoag; and the man who

seconded this move, and backed it up with well chosen words, was none other than the gallant Col. John H. Stevens, who has just given us this cordial speech of welcome. And the man who presides over our deliberations to-day, although not an old man, was also one of the pioneers of this grand metropolis, and one of the original twelve who contributed so generously in 1866 in fanning the breath of life into this Society.

There are several other noble pioneers of this city, who have contributed time and money freely, in furtherance of the good work of this Society. We have no time to dwell upon this pleasant feature of our association, but it suggests to us a conundrum, viz., Why is the beautiful city of Minneapolis like Paradise, or the Garden of Eden? This question has already been answered, viz., Because the first white settlers were distinguished gardeners, or horticulturists; and this accounts for the fact that this Society still continues to linger here, and always looks back when departing.

While this city never ignores the substantials, such as wheat, corn, beef and pork, yet they recognize the fact that a city that goes back on all else is sure to become sour and dyspeptic. You admit that the spice of life, the vegetables, fruits, flowers, poetry, song, romance, object lessons, such as are to be found in parks like Minnehaha, etc., etc., are all indispensable to correct living.

Some cities in the Northwest could hardly be hired to entertain a Society like this, they are perfectly contented with the substantials, and the dyspepsia is the legitimate result of such contentment. It would be fortunate, indeed, if the pioneers of every city in the whole land, like Minneapolis and the Garden of Eden, were horticulturists, and then these missionary societies would be compelled to move around from city to city, as regularly as the heavenly planets in their orbits, or there would be visible disturbance in the constellation.

There was no such city in existence as Minneapolis when we first visited this place, while now we are informed, by parties who ought to know, that if the city continues to grow as rapidly in the future as it has done in the past, that in thirteen years it will contain a population of one million. Now this means business for this Society, and a score of heavy, live branches, who will help us to prepare for the million! We feel that we can count on this city to do more than her share. Again, allow me to thank you for your cordial welcome. (Applause.)

REPORTS FROM LOCAL SOCIETIES.

The Secretary stated that he had written Prof. Asire, secretary of the Hennepin County Horticultural Society, but had received no report as yet from him. He understood no meetings had been held by the society for several months past.

The following report was then read:

SOUTHERN MINNESOTA HORTICULTURAL SOCIETY.

Following is a report of the winter meeting of the Southern Minnesota Horticultural Society, held at Rochester, Jan. 1 and 2, 1889.

President A. W. Sias called the meeting to order and H. W. Stedman, being made secretary *pro tem.*, read the report of the secretary, Edwin Deacon, who was not present. In this report the society was congratulated on account of its success; for starting with seven charter members its membership now numbers fifty-nine, twenty-six different villages being represented.

The society was incorporated in June, 1888; the following members were the incorporators:

A. W. Sias, Edwin Deacon, Wayland Stedman, John Bamber, E. G. Ballard, Rochester; C. H. Pond, Kasson; John S. Harris, La Crescent; S. A. McHenry, St. Charles; E. D. Sias, Rochester; E. H. S. Dartt, Owatonna; J. M. Underwood, Lake City; J. H. Vandervort, B. F. Hotaling, Edward Searing, Mankato; Dewain Cook, Windom; Wm. L. Martin, Smith's Mills; H. W. Mendenhall, Garden City; Albina Larkins, Mankato; Chas. T. Wagoner, Eagle Lake; John Wunder, Winona; O. M. Lord, Minnesota City; Wm. Somerville, Viola; S. Wedge, Rochester.

The summer meeting of the society was held on the fourth of July, at "Bamber's Grove," near the city of Rochester. A goodly number were present, a very creditable exhibit of berries, vegetables and flowers was made and premiums awarded, after which the society listened to some remarks by two of Minnesota's pioneer horticulturists, J. S. Harris and A. W. Sias.

There is certainly much in the present status of our society to give us encouragement, and we ought not to enter our second year of labor with any feeling of discouragement, for this year; if each member does but a part of his duty, the membership may easily be swelled to one hundred or more.

One other topic that might receive mention is our relation to the State Society. This, it seems, should be the most amicable. A large majority of our present membership have never belonged to the State Society.

It is possible that a few may join our society in preference to the State Society in order to get the report at half price, but with its liberal appropriations from the state, that society is not greatly in need of a few paltry membership fees, but is in need of a deeper interest in horticultural matters among the people of the state, and that interest the Southern Minnesota Horticultural Society proposes to do its level best to arouse. We believe the more local and sectional societies we get, the more interesting and profitable the state meetings and state reports will become.

The secretary's report closed with his resignation. As he lives at a place quite remote and has his mind occupied by subjects foreign to horticulture, he believed that some member actively engaged in horticulture should be secretary. His resignation was accepted and a vote of thanks was passed for the ability displayed and the disinterested manner in which he had served the society.

The treasurer's report was read and accepted. This report showed that $31.40 had been received during the year, and there was a balance of $9.15 in the treasury.

A paper from S. D. Hillman was read and ordered placed on file for publication. This paper called out considerable discussion.

Mr. Hillman had planted an orchard on his farm in Olmsted county, but had sold the farm before the trees had begun to bear. The man who bought it pulled up the trees and threw them away, saying that he would "raise" his apples from his wheat bin. But time showed that he made more of a failure in wheat raising than did his neighbors in apple raising; and that he might have made money if he had allowed the trees to stand.

It was stated now, beyond all doubt, plenty of apples could be raised in Southern Minnesota. A large crop was gathered the past season. Give the proper soil and a suitable location and good cultivation and a crop of apples is almost a certainty.

The Duchess and Tetofsky will repay liberal manuring. A half load to each tree is not too much.

Mr. Gaylord set out a Duchess by the side of a large manure pile and he got more apples from it than from the best two in his orchard.

A communication from Mr. William Ward was read and ordered placed on file.

J. G. Miller, of Dodge City, Rice county, sent in a report on seedling apples, which was read and ordered placed on file.

The Peerless and Willis seedling apples were raised by him, and were highly spoken of in the discussion.

The meeting then adjourned to meet at 7:30 in the evening. At the evening session the president read his annual address, which was ordered published. It called out considerable discussion, during which Messrs. Gaylord, Harris and Moon made some very interesting remarks.

J. S. Harris read a paper on the "Present Outlook for Apple Culture in Minnesota." It was ordered placed on file for publication.

A paper from D. W. Beadle, of Ontario, Canada, was read, entitled "Evergreens in Ontario."

The meeting then adjourned to meet at 9:30 the next day, Jan. 3, 1889.

The report of the chairman of the fruit committee, Mr. Dewain Cook, was the first paper read.

He considered the Snyder blackberry the best in cultivation, quality considered; while the Windom dewberry was very productive; but those who were at his place and saw Windom dewberry, and tasted the fruit, said that they could not see how any blackberry could be better in quality.

Mr. Gaylord said that, during the past season, at his place plum cuttings had taken root and made quite a growth.

H. W. Stedman said that gooseberries were one of his favorite fruits, and that an agent of L. L. May & Co., of St. Paul, was selling in Rochester a mammoth variety, which he said grew as large as plums. President Sias also leaned favorably toward the gooseberry. One year he had raised and sold in Rochester twelve bushels. He had grown the Mammoth, or English gooseberry, and had found it a shy bearer and liable to mildew. Gooseberries need a rich, moist soil and clean cultivation and frequent pruning.

H. P. Moon, of Spring Valley, said that he grew a number of varieties of gooseberries, and had once, at a high price, bought some English roots; but did not find them to be any better than those he already had.

E. Gaylord then presented the subject of "Sun-scald and Its Prevention." He showed samples of trees that had been killed

by sun-scald. His remarks were very interesting. He was elected an honorary life member of the society.

AFTERNOON SESSION.

The following officers were elected:

President—A. W. Sias, Rochester.

First Vice President—J. S. Harris, La Cresent.

Second Vice President—M. J. Hoag, Rochester.

Secretary and Treasurer—H. W. Stedman, Rochester.

Executive Committee—J. Bamber, S. G. Whiting and L. McLean.

Mr. C. A. Van Campen, secretary of the Southern Minnesota Fair Association, then made a short address.

He hoped that the two Southern Minnesota societies would always be close friends. Both were interested in the prosperity of this section of our state and desired a creditable fair. He knew that the horticultural society had greatly contributed toward making the fair attractive and successful.

A paper on floriculture, by Mrs. A. E. Larkin, of Mankato, was next read. She was given a vote of thanks for presenting such an interesting paper and was made an honorary member for one year. The hope was expressed that she would again favor the society with another article.

H. W. Stedman next read a paper entitled "Smith and Jones; or, how Horticulture Assists Agriculture."

During the discussion, President Sias said that he had known farmers, who, by neglecting horticulture and having neither trees, gardens, fruits nor flowers, had made their farms so unattractive and lonesome that their wives became insane and that their children, when old enough, were glad to leave for the city.

It was stated that many of our native trees and shrubs growing wild in river valleys and on hills were very desirable and beautiful, and that if they were sold by tree agents for high prices, they would be appreciated and planted. Among these are the Wahoo, or burning bush, which, with its bright crimson berries, looks lide a tree of fire all winter, and the Bladder Nut, the Dogwood, the Woodbine and the Buffalo berry, and vines such as the Clematis, Bitter-sweet and Virginia Creeper.

J. S. Harris read a paper on "Insects Injurious to the Horticulturist." He described at length the white grub, an insect that feeds on strawberry plants. In the discussion he said that

the skunk is a friend to the gardener. It digs into the ground and destroys worms and grubs that are difficult to reach with poison. He protects them at his place, and whenever he meets one in the evening, he always turns out for it and lets it keep the path.

A paper on "Seedling Apples" was read by E. H. S. Dartt. During the discussion it was said that in Russia, a very cold country, where the thermometer frequently shows sixty degrees below zero, there are plenty of very good apples raised. These apples come from seeds planted there, and it is from seedlings grown from seeds of apples that grow here that we expect hardy apple trees.

Planting apple seeds should be encouraged.

A communication from F. W. Louden, the originator of the Jessie strawberry, was read.

A committee consisting of J. O. Barrett, Browns Valley; J. S. Harris, La Crescent; E. H. S. Dartt, Owatonna, and A. W. Sias, Rochester, was appointed to petition the legislature for an appropriation of $1,000 to aid four district horticultural societies, to be known as the Northern, the Southern, the Eastern and the Western Minnesota Horticultural Societies.

Respectfully submitted,

H. W. STEDMAN,

Secretary.

DISCUSSION.

Mr. Harris. Mr. President, I was at the meeting at Rochester, and it was a very successful one in every way but one, and that was the attendance. There was material enough, and talent enough to interest an audience of 1,000 people, including five hundred of the citizens of Olmsted county. Some of the papers were remarkably good, and I hope the committee may find room for their publication in our next volume of transactions. One paper by a Mankato lady, speaks well for the ladies of Minnesota.

Now, I am of the opinion that a district society will not hurt the State Society; that we ought to help all the local societies that can be started in the state. We ought not only to have four district societies, but a hundred county and town societies in the state. In that way the people will be educated up, and will be anxious to take degrees, just as we do in our secret societies; we will commence at the bottom of the ladder and go right up. In fact, at that meeting, I was reported as saying that we

had commenced at the wrong end by commencing first with the organization of a state society; that if we had commenced with these small organizations in towns and counties we might have been able to have a state society with from 2,000 to 5,000 members; and that we ought to use every legitimate means to increase its membership. But, gentlemen, when we were a little band of a dozen members, people abused us; they said "get out of our way, you cranks, what do we want of you." But our numbers steadily increased until we had fifty or sixty members at one of meetings at St. Paul. At one time we invited the legislature and the governer over here to Minneapolis, and it was found best to spare us a little longer. The legislature listened to our plea and gave us a little aid, and published our transactions in 1873. We went to them again and asked for help for an experimental fruit station, for the originating of new varieties. This request was granted and a fruit farm was purchased at Minnetonka, and Peter M. Gideon placed in charge. It was a little rough, but they did not ignore us. A short time after that we wanted $1,000 a year to aid our Society in distributing its reports, and in employing a secretary to take the minutes. We got it. We have asked for an experiment station between the two cities; we have got it. And we asked for an experiment station at Owatonna, and we have that, with a prominent officer and member of the Society in charge, where we intend to keep him so long as he does his duty.

I trust the members of this Society will remember that we have organized at least one district horticultural society in this state; that there is room for three more, and room for a hundred county and town societies.

President Elliot. I wish to call attention to one thing mentioned in the report and that is in reference to the membership fee of fifty cents, and members of the society being entitled to a copy of our reports. Is that not rather hard on the State Society? By becoming a member of the district society should they be entitled to them without paying one dollar?

Mr. Sias. Mr. President, as a general thing if I undertake to differ with Bro. Harris I make a mistake, and it turns out that he is right and I am wrong; but there was one little point that he made that I was not exactly satisfied with. The most that he said was correct and I agree with him, but in regard to our having made a mistake when we organized a state horticultural society, instead of beginning with township and county societies,

I would like to hear discussed. He claims that we commenced at the top of the ladder and are working down. Now, it looks to me that the state was then new and there wasn't at that time horticulturists enough in the whole state to form what many would call a good society, in order to do business in good shape. Had we started in that way and undertaken to form simply township organizations I believe we would have made just as perfect a failure as we would to undertake to start a sawmill where there was no water power. I think we commenced right.

I might compare our Society with western New York, where I formerly lived. They have had their societies there for some thirty-four years, but I think no state society up to this time. They organized at Rochester, N. Y., a county or district society, which was controlled by the nurserymen there and which has been run in their interest pretty generally since. And now they are agitating the propriety of making it a state society and asking for state aid. I think they have just reached the point where they should have started, as they could have published and distributed their reports much better than they are able to do now. They now see they are behind the western people, although I may say there is no better horticultural district, perhaps, than that of Western New York. But I think Iowa in this matter is ahead of New York State to-day.

Mr. Underwood. What do I understand about their getting our reports for fifty cents?

President Elliot. Any local society making an annual report to this Society is entitled to our reports and a membership for fifty cents, and the question is, whether they should obtain them at a less rate than we charge our own members.

Mr. Underwood. If that is the case I don't know as it is anybody's fault but our own. That matter may need to be changed in some way. I should say that Mr. Sias is certainly correct in his position that our State Society, acting as the head and source of the horticultural interests of the state, can be very much more effective than to commence in the other way with the local organizations. This has been nicely illustrated in our section of the country in the past year, in the workings of farmers institutes. It is hard to get the farmers interested in this subject. They are more taken up with raising wheat, cows, horses, hogs and things of that kind; and in order to interest them in anything we desire we have got to go to them. I believe that the best possible way that we can do it is to lend them assistance as a State Horticul-

tural Society at these farmers institutes, or any similar organization that will go out among the farmers of the state, to the smaller towns of the state, and there give them object lessons, and such information as will encourage them to become interested in the work of this Society. It certainly is the best field and the best direction in which we can work, in my estimation, and I should say most decidedly the members of any society should at least pay our State Society a dollar for a membership and our transactions.

Mr. Sias. Mr. President, I recommended that reduced fee to members of our society at Rochester, for the reason that we have no state appropriation; and after looking at the matter for some time we concluded it was better to make this arrangement until we could get some aid, and to make our membership fees low until we got a start. When we get well started in our work in the course of a few years we may probably change and make it the same as the State Society, one dollar.

Mr. Smith. I don't know as this matter of membership fees amounts to very much anyway. I believe all who are members of the State Horticultural Society are members because they have an interest in the work as an industry, and not so much on account of getting the reports; because we know there are hundreds of copies distributed gratuitously every year to those interested in horticultural pursuits. I think those that have sufficient interest in horticulture desire a membership in the Society and pay their dollar, and those who are not interested do not pay it. So I do not think that amounts to very much.

Horticulture in Minnesota has not yet passed out of the missionary stage. We as a central organization, as a State Society, must carry this work to the farmers, interest them in the work, and it will be time enough to decide in regard to membership fees and the price of the reports when there comes to be a demand for them beyond the supply; but while there is an over supply of reports on our hands, and while it remains a question as to how we can best get the reports into the hands of those who will be benefited by reading them, perhaps we had better not be too particular about the membership fee. Because I believe, so far as I am concerned myself, if there is some poor fellow out on the prairie that really needs one of these reports, who would be benefited by having it, I would rather give him a quarter to take it than ask him to pay a dollar for a copy. That is the work we are doing rather than collecting fees. I can not

see that it materially interferes with the membership of our Society.

I agree with Mr. Sias, that Mr. Harris was mistaken as to the organization of township societies before organizing a state society. It struck me in this way: how much of a show would those "original twelve" have made when spread out over all the towns of Minnesota? If there were only twelve men that could be found who were enough interested in Horticulture in the state to undertake to start a society, there would not have been material enough to start very many township societies.

The way I look upon horticulture in Minnesota is this: It has been a little over twenty years since this Society was organized and the cause is still in a missionary stage. And this is one of the difficulties we found in the farm institute work; there is not that interest in horticulture that there ought to be, and therefore it has been necessary to fight its way there as best it can. I repeat that our work is missionary work. The question is not so much what people shall pay for this information, but how can we best get it before them and attract their attention to it.

Mr. Pearse. Mr. President, I think it has been a custom heretofore to furnish each local society with fifty copies of our reports. I think that is right and proper and they should have them free. In this way our reports are scattered over the state and those interested can obtain them. I think, however, the number sent out to local societies should be limited and should not exceed that amount.

President Elliot. We have gained the point we wished to bring out by calling this matter up. In directing attention to this matter of fees we wanted you to take the view expressed by Mr. Smith, that we are not working for the fees, but our Society is aiming to do missionary work. We do not care so much how this information goes before the people so long as it goes there, and we wanted to get you interested a little in the right direction.

The following report was then read by the Secretary:

MINNESOTA VALLEY HORTICULTURAL SOCIETY.

GRANITE FALLS, MINN., Jan. 9, 1889.

S. D. Hillman, Secretary, etc.:

In compliance with your request I briefly report the condition of the Minnesota Valley Horticultural Society.

We are not in as flourishing condition as we would like, our meetings not having been very well attended of late. Our members are widely scattered and something has prevented a full attendance. We think we have made the mistake of seeking too many as members who were not particularly interested in the matter.

We are arranging for a meeting in the near future and hope to be able to get a goodly gathering, and secure continued interest and support. We try to place the reports of the State Society where they will be profitably used.

Horticulture is receiving more and more attention and we hope to embody the results of this growth in future reports of this society.

The present officers are:

President — J. Cook, Sorliens.

Secretary — A. B. Regester, East Granite Falls.

Treasurer — W. R. Rice, East Granite Falls.

Yours truly,

O. E. SAUNDERS.

LAKESIDE HORTICULTURAL SOCIETY.

No report having been received from the secretary of this society, a report was called for from its president, Mr. J. O. Barrett, of Browns Valley.

Mr. Barrett. Mr. President, I wish I could report something that was worthy of emphasis. Last summer, as most of you at least are aware, I was interested somewhat in the horticultural institute work, mention of which was made here, and we had no meeting during that time. In fact we have held no meetings as a society during the past year, or since the last farmers institute was held there, a year ago last November, I believe. That was held under the auspices of the Lakeside Horticultural Society, and it was a grand success.

Our people, those who are particularly interested in horticulture, are very much scattered, and it is almost next to impossible to get them together even sometimes to form a quorum. Their whole work falls upon my poor shoulders. I have labored ardently for it and sacrificed as much as I could. But still, our society is alive; the members would respond to a call when something of importance is pending. We have scattered our reports and given them out to the best advantage, and find they

are appreciated highly. I judge we are in about the same condition as some other local societies in other parts of the state.

Let me be understood; our people are scattered, but they are struggling and battling for a foothold. You who live here under the environment of forests do not know—some of the members who reside in the park region doubtless do—but you have no idea of the conflict we have had to engage in, out on the open prairie. We have had to fight against winds, and blizzards, and dust, and a thousand things which are beating upon us to destroy; and still our people are hopeful.

A large proportion of our population are quite indifferent in regard to horticultural matters. Very little interest obtains as a whole in regard to forestry. Now and then a man is interested; but like every other movement, far-reaching and embracing real results, by the law of evolution, in process of time we trust our people will wake up to the necessity of having forests.

In closing, sir, I wish to ask whether that matter will come up for consideration before the Society?

President Elliot. It will come up again in the discussion.

Mr. Barrett. If it should not, I would like to say something about it.

Mrs. A. A. Kennedy, of Hutchinson, secretary of the McLeod County Horticultural Society, then read the following report:

THE FRUIT-GROWERS.

REPORT OF THE RECENT MEETING OF THE COUNTY HORTICULTURAL SOCIETY.

The McLeod County Horticultural Society held its fourth annual meeting at Hutchison, December 4th, and was called to order by the president. Mr. Benjamin being called to the chair, M. Cutler acted as secretary *pro tem.*, Mr. Corson being absent. Minutes of last meeting were read and accepted. Report of secretary and treasurer read and approved. A bill was presented by M. Cutler for expenses to the amount of two dollars and fifty cents and allowed.

Letters were read from Mr. Green, of state experimental farm and Wyman Elliot, president of the State Horticultural Society, stating their inability to attend. An interesting address was read by Mrs. A. A. Kennedy, giving a lady's experience in fruit

culture. Mr. Benjamin told a story of a lady in Louisiana who cleared seventy-five dollars on one acre of cucumbers, also gave some valuable information of horticultural work in that state. The question was then asked, which kind of strawberries Mrs. Kennedy considered the most productive. Answer, Crescent and Charles Downing. Mr. Cutler and Mrs. Bonniwell thought cornstalks and leaves the best mulching. Quite a discussion then took place concerning raspberry culture.

Moved that a vote of thanks be tendered Mrs. Kennedy for her paper, also that a copy be furnished for publication and a copy sent to the State Horticultural Society, also a vote of thanks to Mr. Stubbs for his paper.

The election of officers then took place, as follows:

President—M. Cutler.

Vice President—M. T. Ridout.

Secretary—Mrs. A. A. Kennedy.

Treasurer—Mrs. Anna Bonniwell.

EVENING SESSION.

Meeting called to order by the president, who read his annual address. Mr. Ridout asked for information concerning the culture of strawberries. The president gave his ideas of their cultivation. Mr. Ridout offered as an apology for not writing an essay as requested, lack of time. He gave us about two minutes' talk on agriculture. Said he thought if our fairs could be conducted on a different plan they would be of more value to the farmers. For instance, if there could be less horse racing and gambling and less money expended for these purposes and larger premiums offered for farm products, the farmers would take more interest in trying to make them a success; also said he thought there ought to be an experimental farm established in every county, and premiums offered, and then farmers would take some interest in raising fruit. He produced some fine specimens of seedling potatoes from the Beauty of Hebron, which he raised at the rate of six hundred and seventy-two bushels per acre. Also some Golden Ball millet that was pronounced by those present to be far superior to anything of the kind yet introduced. Mr. Cutler exhibited a can of blackberries, that carried us away back to the mountains of the East, where in our childhood we were wont to pick the delicious fruit. Mrs. Bonniwell exhibited a can of red

raspberries that were of such bright, beautiful color as to attract particular attention. Mrs. Kennedy brought in a sample of sorghum syrup which was pronounced very fine. President offered a resolution that the law pertaining to tree peddling remain as it is. It was moved and seconded that the next annual meeting be held at Hutchinson. Motion was made and carried that there should be a summer meeting held at Sumter.

On motion the meeting adjourned *sine die*.

MRS. A. A. KENNEDY,
Secretary.

SOUTHWESTERN MINNESOTA HORTICULTURAL SOCIETY.

The Secretary stated he had written to the president and secretary of the society at Mankato and had received no formal report. He had, however, a letter from the president of that society, Hon. Daniel Buck, which was then read.

LETTER FROM HON. DANIEL BUCK.

MANKATO, MINN., Dec. 22, 1888.

S. D. Hillman, Esq.,

DEAR SIR: Your letter of December 11th came duly to hand, but I have been busy and away from home or would have answered sooner. I have so much to do for the next three weeks that I can not prepare an article on grape culture and even if I had the time I doubt if I could prepare a suitable article.

Although I have had over twenty years' experience and have some thirty-three varieties of grapes, yet when one comes to put his experience on paper it is no easy matter.

Our society flourished for a spell and then the members seemed to be indifferent and I have about made up my mind to let horticulture and agriculture alone and devote my time to other matters except for my own enjoyment and pleasure.

I received your package of books and have been giving them to the proper persons.

Yours truly,

DANIEL BUCK.

DISCUSSION.

President Elliot thought the experience of those who had undertaken to organize a local society at Mankato was similar to that which would be met with elsewhere unless a determined effort was put forth on the part of those who undertake to carry forward this work. Unless it was carried on upon some systematic plan, we would not be over burdened with reports. He hoped the members present would consider this question, and see if some way could not be devised whereby to enlarge their field of usefulness and create a deeper feeling of interest in the cause of horticulture throughout the state.

Mr. Smith said he wished to say a word in regard to those interested in horticulture at Mankato. There were many persons in that vicinity who have taken a lively interest in the subject. He had visited farmers there this last fall who had good orchards and had large numbers of grape vines. He knew of no more promising field for horticultural labor than Mankato. If Mr. Buck was discouraged and didn't want anything more to do with it, it would be well for some of us to push the matter and see that the local organization there is kept up. We should give them whatever encouragement was necessary to keep their society alive; if their people, for any reason, were lacking in unity of purpose or interest in the matter, which was essential to the success of such an organization. By doing this he did not doubt good results would follow in the future in that locality.

Mr. Sias. Mr. President, it seems to me that they made the mistake at Mankato in trying to orgaize a society that often occurs; they tried to run it without any money. Our president says we must put more enthusiasm into this work; that is correct. And I will add we must put in more money. It is said there is always a reason for everything, and so I wish to show you why we did not make so complete a failure at Rochester as they seem to have made at Mankato.

It is a good place to raise fruit at Mankato; it is quite as large and prosperous a town as Rochester. But we had our members put fifty cents apiece into the treasury of our horticultural society, and so we did not make a complete failure. I am satisfied a horticultural society will not run without money; in fact I have never known one to run successfully very long anywhere without it. They have not only to put in "enthusiasm," but money! And when we can get the money, then we may have

an Eastern, Western, a Northern and a Southern Minnesota horticultural society and such ones as may be successfully run.

Mr. Underwood. Let me clinch what I said awhile ago in regard to our reports. If you have put fifty cents into the cost of a membership in your society and made it a success, while at Mankato with no fee at all they have made a failure, why would it not be better still to charge a dollar and make it still more of a success?

Mr. Harris. I am glad to see Mr. Underwood hit my friend Sias, as he deserves to be hit once in awhile. I wanted the fee made a dollar and to see the Southern Minnesota Society built up so that it might divide the honors with the State Society.

Mr. Terry. Mankato counts herself as being the metropolis of Southwestern Minnesota, and in starting an organization she called it by the name of the Southwestern Horticultural Society. Now, I belong to that portion of the state, have corresponded a great deal with different parties in that section of the state, in Mankato and Blue Earth county, and it is a surprise to me that I have to come to Minneapolis to find out that we have a southwestern horticultural society.

The gentlemen who have spoken on this subject it seems to me are clinching it stronger and stronger. It does take money to carry on this work if it is to be better in the future than in the past. Everything we undertake requires money to carry it on. But, fortunately, this is one of the things that it seems as though a kind Creator had made so natural for us that it should not cost so very much to start in it as in some other things.

If fifty copies of our reports have been sent to Mankato where are those copies now? It does seem as though some of the fruit ought to be seen in every case. Mankato has other counties around it that have added to its prosperity, counties that have large dairy and other interests, and they have held out their hands to support Mankato, but they haven't been asked to lend their support in this enterprise of starting a district society there.

Again, in my own case I had to be introduced to your State Society by a gentleman in Central Illinois. I was in Central Illinois when a gentleman produced a copy of your reports, and I found out for the first time that we had a live and prosperous State Society here in Minnesota, and as I examined its pages I felt encouraged at the instruction received therefrom. I believe I should have often gone astray but for the system that my place shows from following the instruction gained largely from these

reports. And I believe that every member with a judicious use of these reports can succeed. I will say further that I believe if you will use them properly where most needed that you will not get the branches only but trees; for I do not believe you should begin with the branches but should grow the trunk first. (Laughter.) And I believe you have got to let your wood grow in the branches, and you want to take particular notice and so train the wood that you will give every advantage to the fruit buds that you possible can.

I believe it only needs just such energy as Minneapolis people have in order to establish successful horticultural societies in every county, and then this Society will be proud of its fruit. When we remember that our Society is not for the building up of nurserymen, not for the purpose of enabling its members to sell you their goods for a profit, but that the object of this Society is to afford instruction how to grow the products of the garden and the choicest of fruits for the table, that the object is not so much to benefit money making people as it is to assist the hard-working, common people of Minnesota to do that which they can not do without they put forth proper effort, we can then see something of the importance of the task that is laid before us and may take courage to carry forward the worthy cause. (Applause.)

Mr. Harris. I wish to say a word about that society at Mankato. It is not much more than nine months old, as it was organized last March and was the outgrowth of a farmers' institute held at that place, in a rather unfavorable time of the year. The roads were blockaded so that it was difficult for farmers to attend from a distance. I was at that meeting and I distributed about one hundred copies of our reports. We had the most interesting classes in horticulture we had at any of the points I attended, in the institute work. People took a deep interest, not only in grape culture but in every branch of horticulture. At my solicitation they called a meeting to organize a society there and their first meeting was an enthusiastic one. Two or three other good meetings have been held since. With a proper leader there to get out suitable notices I believe the people of Mankato would respond readily and sustain a live society there.

President Elliot. We have with us to-day a noted man from Indiana, Prof. W. H. Ragan, of Greencastle, secretary of the American Horticultural Society. I wish to introduce him to you at this time that you may all become acquainted with him. He is an earnest horticulturist.

REMARKS OF PROF. RAGAN.

Prof. Ragan. I have been quite tempted for the last few minutes, Mr. President, to introduce myself to this audience, and I have felt inclined to say something on this very important subject that you have just been discussing, that of keeping up the interest in such organizations as these. It can not be denied that local societies are legitimate feeders of such societies as this, and how to promote the interest in these local organizations is the question that you seem to be trying to solve. It is one that has interested us in Indiana. And while we have not yet reached a solution of the question fully we have probably thought it over in some different forms from those suggested so far in this discussion. In the first place the matter of a fee is the one important thing; it is really important to hold the interest of the members in the organization. It certainly is important to keep up the necessary work of the organization, for that can not be done without some money.

The plan that we have hit upon in our state—and I can not say that it is working entirely satisfactory, I wish I could—is about like this: We found that we needed more local societies and we needed to bear a close relationship to those societies, and in order to effect that result, some years ago an amendment to our constitution was adopted which provides that any local society, or its members, may become members of the state society on the payment of one-half of the usual fee; that is to say, they come in as members from local societies. They must come through the regular channel, however; that is, the secretary of the local society must report the names, and then they are entitled to membership for one-half the usual fee and the names are published in a separate list, as you may have noticed in our last reports.

So we have in our state quite a number of societies of this character, some of long standing, and others that have been built up since this new arrangement has been entered into. We are still building up new ones and the executive officers of our society feel an interest in building up these local societies, and we have gone out and helped to organize them. When these names come in then they are entitled to full membership, and if the fee in the local society is only fifty cents they can become members of the local and of the state society on the payment of one dollar, which they would have to pay for membership if not

members of local society. The plan has not worked altogether satisfactorily but it is adding to the interest and distributing our work more equally over the state.

Another innovation of some years' standing — we have six vice presidents in our state. They are located in six imaginary districts laid off for that purpose; and those vice presidents are expected to make reports to the society from their districts. They receive and compile local reports that come to them and present them to the state society in a proper form. For this work they become somewhat distinguished by having their membership free, so that our vice presidents pay no fees for membership for the year they are elected. This arrangement seems to be working satisfactorily.

I am very glad, Mr. President, to be with you on this occasion. It is my first visit so far north and to your state. I have known many of your people by name, some by correspondence and a few by personal acquaintance for years. But it is a great pleasure to be with you on this occasion and to enjoy the privilege of listening to your discussions. At another time during your meeting I may be moved to say someting. I thank you for the present.

President Elliot. Our Society is honored to-day by the presence of another delegate who is present here from Evansville, Wisconsin, Mrs. V. H. Campbell, whom I would like to introduce to you at this time.

REMARKS OF MRS. CAMPBELL.

Mr. President, and Members of the Minnesota Convention:

I don't know that I can say anything to you or that I could take up your time with anything that would be of interest. I have long been desiring to become acquainted with the leading horticulturists of your state and to visit your beautiful city of Minneapolis; and now my desire is to be gratified. I shall take a great interest in your convention work. We have a flourishing society in our state. I don't know how many members it comprises, but we now hope to have permanent rooms in the state capital which we have not had before, which will be occupied hereafter by the state society. I will not take your time further.

President Elliot. We have with us also another delegate from Wisconsin, Mr. A. J. Philips, of West Salem, whose face is

familiar to many of us. I have pleasure in introducing him at this time.

REMARKS OF MR. PHILIPS.

Mr. Chairman, and Gentlemen of the State Horticultural Society of Minnesota:

As your President has said I have met with you quite a number of years. I attended your meeting when it was held in the city of Winona some years since, and was a member of your Society for a number of years. I also met with you at Rochester. I will say that I always enjoyed these meetings where I have obtained a great deal of information concerning horticulture in this state. You know I really belong about as much to Minnesota as to Wisconsin, as the part of the state in which I reside is just over the river, with Minnesota on one side of the Mississippi and Wisconsin on the other side. And so anything that pertains to the subject of how to produce hardy fruits that will be of advantage in Minnesota I feel is equally applicable on my side. I will not take your time longer, gentlemen, but will add that I am very glad to have an opportunity of meeting with you.

President Elliot. We have with us a delegate from Iowa, Mr. Elmer Reeves, of Waverly, whom I desire to introduce to you.

RAMARKS OF MR. REEVES.

Mr. President, Ladies and Gentlemen:

This is my first visit to a society outside of the state of Iowa. In our state we have a flourishing state society. They are now located permanently in their rooms at the state capital. We also have three local societies, the northern, the eastern and the western, and they are all in a flourishing condition. The plan that they adopted for membership in the local societies is to charge one dollar. That entitles the person to the state report. In this state report is also published the proceedings of the local societies. We find this plan works very well.

President Elliot. We are very glad these delegates have come here. We hope we may be able to gain some information from them and we hope they may be able to carry a favorable report home with them to their societies; we hope you will give them all a nearty welcome. We have another gentleman here who has recently come to the state, who is taking an active part in

the development of our horticultural interests, and who is connected with our state experimental farm; I refer to Prof. Samuel B. Green.

REMARKS OF PROF. GREEN.

Ladies and Gentlemen:

I feel that I have an important work to perform in the department placed under my charge on the state experiment farm, as I am in charge of the horticultural department. So long as I have charge of that department I wish to make it a grand success and to represent all the horticultural interests of Minnesota. And in order that I may do this I shall need all the assistance and kindly advice I can get from the horticulturists of Minnesota and especially of this Society. I am very glad to be at this meeting where I hope much information will be brought out as to best methods to be pursued to achieve the best results in our work for the coming year. I have been preparing a report, but which will not be ready for distribution until some time in February. But you can all receive a copy by sending your names to the station.

I would like to receive kindly criticisms and suggestions concerning my work so that we may be mutually benefited. I shall always be glad to profit from your counsel and advice. I have not come here merely to draw my pay, but I expect to give an equivalent for what I receive. I don't expect to work miracles, but I do, by careful work, by comparison of results, experiment and trial of new varieties, to be able to produce something that may be worthy of your consideration.

CORRESPONDENCE.

FROM CANADA.

CENTRAL EXPERIMENTAL FARM,
OTTAWA, Dec. 24, 1888.

S. D. Hillman, Secretary Minnesota State Horticultural Society,

MY DEAR SIR: I thank you for the programme you have sent me of your winter meeting to be held in January next. If you were nearer I should like to be present to join in your discussions.

I hope you will have a very pleasant and profitable time.

Yours very truly,

WM. SAUNDERS,
Director.

FROM MICHIGAN.

SOUTH HAVEN, MICH.

S. D. Hillman, Secretary, etc.

MY DEAR SIR: Your very kind and complimentary letter is at hand. I shall of course be very glad to know that the report you mention proves satisfactory to the fruit planters of the Northwest. Had the work been deferred for a time, it could, beyond doubt, have been rendered more conclusive as to much of its matter.

It would be very pleasant to me to be able to attend your annual meeting, but this is impracticable. I am glad to know that you are finding some useful apples among the new Russians. I have letters from Prof. Budd, saying that he has this year fruited a large number of the more recent introductions from Eastern Russia, and finds his anticipations respecting them largely realized both as to season and quality.

From what I observed while in your state I suspect that possibly your most serious obstacle to apple culture will be blight, unless the discovery of the cause (bacteria?) shall develop also the remedy.

Very truly yours,

T. T. LYON.

FROM IOWA.

AMES, IOWA, Jan. 11, 1889.

S. D. Hillman, Secretary, etc.,

Your favor at hand. I am sorry that my time will not permit me to be with you or to prepare notes on Russian fruits. I am not sorry that I adopted the plan of sending out plants for trial. yet it brings war for two reasons. (1). The ones who receive the trees scold if they do not all grow and do well; and, (2) The nurserymen scold as they assume we are running opposition to them.

But we only propagate in a small way and out of it will come good in the near future, even if I get snowed under.

Yours fraternally,

J. L. BUDD.

FROM DAKOTA.

BROOKINGS, DAKOTA, Jan. 15, 1889.

S. D. Hillman, Secretary, etc.,

MY DEAR SIR: When I promised to prepare a paper for you on the present status of Dakota horticulture, it was with the belief that I had a long vacation before me. The vacation was long enough, but it has been filled with work to quite as great a degree as though school were in session. Hence it has been impossible for me to write for you. Please express to your Society my regrets. Should you desire, I will endeavor to prepare the paper in time for your printed volume.

Yours,

CHAS. A. KEFFER.

RAMSEY, MCCOOK CO., SOUTH DAKOTA, Dec. 25, 1888.

Dear Hillman:

I have received your letter inviting my presence at the annual meeting of the Minnesota State Horticultural Society.

I can not say as yet whether I can be there or not; but if not, will try to make up a report of our Dakota horticultural meeting and add some notes of work and observations of the year in the garden, orchard, field and forest.

With a wish for merry holidays and prosperity for yourself and all the other members of your Society, I am,

Yours truly,

OLIVER GIBBS, JR.

FROM PROF. McGINNIS.

ST. PAUL, MINN., Dec. 22, 1888.

S. D. Hillman, Secretary, etc.,

DEAR SIR: I am in receipt of programme for the next annual meeting of the Society.

I recognize in it the names of many persons and friends familiar to me, and thank you very much for sending it.

Although in the railroad business, a business prosaic in the extreme, I have by no means lost my interest in agricultural and horticultural matters. I have spent much time during the last year in traveling over Montana, and, as you may imagine, have studied with deep interest its horticultural features.

I would like very much to attend your meetings, and would suggest if agreeable to you, and my railroad affiliations are not a bar, I would be very glad indeed to give an informal talk to the Society on the general climatic and horticultural features of that wonderful territory, such as the distribution of the forests, the water supply of the country, and also the gradual thinning out of the different kinds of trees indigenous to the Mississippi River valley, and the gradual commencement of species belonging to the Pacific coast.

I am quite sure I can say something interesting to the association in regard to the forest growth and other peculiarities of that great territory.

Yours truly,
D. R. McGINNIS.

FROM PROF. OESTLUND, OF THE STATE UNIVERSITY.

MINNEAPOLIS, MINN., Jan. 8, 1889.

S. D. Hillman, Secretary, etc.,

DEAR SIR: Yours of December 24th is at hand. I shall take pleasure to attend at least some of your meetings, and also give you something on the subject of entomology. It would have been my intention to take up the study of some of our more injurious insects that are of special interest to the horticulturist during the past season, but my opportunities have been, as heretofore, too limited to do anything of special value or worthy

of illustrating, as you suggest. My report will, therefore, be of more general character, and I have thought to give you some short review of the progress of entomology of late years, with some special reference to this state.

All along, as your entomologist, I have felt the difficuly of properly fulfilling my duty as such, as most of my time is given to the study of systematic entomology, or no entomology at all, and I have had very few opportunities to give my attention to the economic side of the study, which alone is of much interest to the Society. I would, therefore, now respectfully ask you to state to the Society that I do not wish to be re-elected, but that this office will now go into the hands of Prof. Lugger, who without all question is the proper person, as he is now giving his whole time and energy just to those questions that are of special interest to the Society. Prof. Lugger has my warmest recommendations to the position.

I shall still be pleased to continue with the Society, at least as a member in paying my annual fees, and to take some part in your meetings that I have begun to take much interest in.

I am yours truly,

O. W. OESTLUND.

FROM WASHINGTON.

U. S. DEPARTMENT OF AGRICULTURE,
DIVISION OF POMOLOGY,
WASHINGTON, D. C., Dec. 29, 1888.

S. D. Hillman, Secretary, etc.,

DEAR SIR: Your letter of the twenty-fourth instant and the program of your next annual meeting have just been received.

Each year since my appointment to this office it has been my hope to meet with your Society and each time, including the present one, I have been disappointed. But I wish to repeat the expression of my desire and assure the members of your Society that I have not forgotten my promises.

The peculiar conditions of your climate are such as to call for the exercise of all the abilities that the scientist and the practical horticulturist possess. So far as my work is concerned I want you to feel that I am your servant and at your command.

There are certain fruits, among which might be named the apple, that are of doubtful success in Minnesota; although there

are some varieties which do reasonably well there, except during an unusually severe winter now and then. But there are other fruits that succeed better there than farther south, especially among the small fruits. With these it seems to me, lie your strong points and if your people will only take them in hand more vigorously, I see no reason why they may not enjoy the fruits of the earth as well as the residents of milder climes.

The grape, when properly handled, that is, covered during the winter, will yield most abundantly and fruit of the most delicious quality, as I have had repeated opportunities to judge. The cranberry is one of the fruits which seem especially adapted to culture there. Immense tracts of land now given up to the straggling growth of nature may yield an annual revenue of millions of dollars. At the Paris exposition, next year, we hope to in some measure enlighten the people of foreign countries as to the value of this fruit, and open the way for an export trade in which your people ought to participate.

The blueberry which grows wild almost all over Minnesota might be turned to account in a commercial way much more than is now the case. By properly treating the wild plantations they may be made very profitable, as has been done in New England, and the quality of the fruit as well as the quantity per acre greatly increased. This may be done by cutting off the other growths of bushes, trees, etc., and burning over the ground while it is quite wet, and yet the grass dry enough to carry the fire. This will tend to kill everything but the grass and blueberry roots which will grow vigorously, and the second year, yield abundantly. This fruit has not been, and it seems, can not be, successfully transplanted and grown under cultivation.

There are many other wild fruits which may be improved and turned to practical account by your people.

The Russian fruit question is one which interests you intensely and it has been my constant aim to determine their value and give your people the advantage of this information. Bulletin No. 2 is perhaps a step in this direction, and I wish to say that there are a good many copies in my hands yet for distribution which may be had upon application. I send you one hundred copies to hand to those who may wish them at your forthcoming meeting.

Believe me, most sincerely,

H. E. VAN DEMAN.

Pomologist.

DISCUSSION.

Col. Stevens. I wish to inquire if the writer is correct in regard to the statement that he makes in relation to blueberries, whether they can be transplanted and propagated or not. I wish to say I have known of it being done here in Minnesota; I have seen it tried here in Minneapolis, and others may have seen the same thing. Mr. McCumber, on Portland avenue, in coming through the swamps near Eau Claire, in an early day, took up some fifty or seventy-five blueberry bushes and set them in his garden, and they grew. I never have seen any in its wild, native heath that have borne so largely as those. It may be true that the blueberry will not stand transplanting with the professor at Washington, but in this climate I have no doubt in saying it can be.

President Elliot. Here is a field for investigation.

Prof. Green. It has been tried in New England but it was not been very successful. Experiments there would seem to bear out the statement of Mr. Van Deman that it can not be easily propagated.

Mr. Barrett. I tried about a hundred roots, taking special pains to place them in well cultivated ground and to protect with a mulching of hay in the row. I also planted some by the river among the trees; but in spite of every effort all the roots died and they were a failure.

Mr. Pearse. Were they transplanted in the spring or in the fall?

Mr. Barrett. They were dug in the fall and the roots buried.

Col. Stevens. I have known of another instance where the transplanting of the blueberry was done with success, and have seen them frequently when growing. I prepared a communication in regard to them at one time when editing the *Farmers' Union.*

Mr. Underwood. Can you give some idea of their productiveness?

Col. Stevens. They were very productive, and even more so than on their native heath.

Mr. Gould. I have grown them on sandy ground.

Col. Stevens. Mr. McCumber planted them on sand, such as the greater portion of this city is built on, and they were grown about a mile and a quarter from here. The city is now built into almost solid blocks to that place, but at that time it was a sandy

prairie. Of course he took considerable pains, as he was an excellent horticulturist and was very successful in the experiment.

Mr. Underwood. We have no trouble in growing them but in the garden they appear to be shy of bearing. But the birds are so numerous that it may account for that. They blossom profusely.

Prof. Green. Do you transplant in the fall or spring?

Mr. Underwood. We have never paid any particular attention to that. Usually we set the plants in the spring of the year. I don't imagine they are difficult to transplant.

Mr. Smith. I filled an order for the plants from Dakota and they seemed to bear transplanting well enough. I had a few left and I set them in a trench and they all lived.

Mrs. Stager. I set out a few plants two years ago this last spring, and they grew nicely. Last spring they were full of blossoms but they produced no berries. I thought perhaps they needed to be shaded, and so I have dug them up.

Col. Stevens. The blueberry is very much like the whortle berry.

Mr. Sias. The blueberry grows wild in Olmsted county, and I got an impression that they transplanted easily. I ran across a patch of about an acre and took up a few plants, and they all grew. I set on a clay loam soil, and as long as I took care of them the continued to bear.

Mr. Pearse. I have a good deal of experience in transplanting shade and forest trees, and find if dug late in the fall and buried, there is no trouble about their growing. If trees are dug in the spring and set out the borers are apt to destroy them, and the trees become diseased.

Col. Stevens. It is not a tree, it is a shrub.

Mr. Pearse. I know what it is. It is so with all roots; it has the same effect with a cottonwood or box elder. The best time to dig them is in the fall.

Mr. Ridout. I would like to inquire whether this is the high or the low bush huckleberry; there are two varieties, I understand. The low bush used to grow in Michigan on high, dry ground, while the other kind always grew in swamps.

Mr. Smith. I presume it is the low bush Col. Stevens refers to.

Mr. Harris. I have never heard of any high bush huckleberries or blueberries growing here.

DEWBERRY CULTURE.

The following letter was read by the Secretary, which was the occasion of considerable discussion:

LETTER FROM MR. LUDLOW.

WORTHINGTON, Jan. 6, 1889.

S. D. Hillman, Secretary, etc.

DEAR SIR: I received your notice some time since that you had booked me for a report on the culture of the dewberry. I am sorry to say I have not a plant on my farm and know nothing of their culture. The only nice field of dewberries I ever saw was in New Jersey a number of years ago on my father's farm on the *back bone* of Stony Hill. When this earth was made I think they must have had more stone than they needed and dumped them there; at any rate there was not a weed nor a bit of grass grew on about three acres. But from somewhere down between the stones the dewberries came up wild and covered the stones, (for there was no earth there to be seen), and hung full of very fine fruit. They were always clean, for no matter how hard it rained there was no mud there. They were only worth from two to three cents a quart, and a long way from market at that, so we used what we could and left bushels to rot.

But I am out of order; I was asked to write on the culture of the dewberry, and we didn't cultivate that field.

Hoping to hear from someone that has had experience with bewberries in this state, I am,

Respectfully yours,

H. J. LUDLOW.

Mr. Urie. In regard to the dewberry I would say that it grows in the South on the poor lands there, but I think it would be a failure to put it on our rich soil, unless we could find a place fit for nothing else and covered with nothing but stone. I don't think it could be raised here successfully. I have picked dewberries in the South by the quart and by the bushel. It is a fine fruit in that country but it could not be cultivated here.

Mr. Dartt. It appears to me there is one idea advanced by the gentleman that will not hold, that because a thing thrives on rough rugged, barren ground, it will not thrive when transplanted to a better soil. If that were true the smart men that come from the rugged hillsides of the East would not thrive as they do in the west. (Laughter.)

Mr. Pearse. Mr. President, I think the gentleman is in error in saying dewberries will not grow on Minnesota soil. I have seen very fine crops of them growing at Minnetonka, both of the Lucretia and the Windom. They will grow here, but I would put them on the poorest land, where they do nicely.

Mr. Urie. They raise a different variety altogether in the South; it is a different berry in every respect. It is no more like the kinds grown here than the raspberry is like the blackberry.

Mr. Sias. I have seen a great many dewberries; have picked them in Indiana and Kentucky. Last year, fourteen miles north of Windom, I saw dewberries on good rich soil that were of better quality than any I had ever seen before, and I did not see any poor or rocky soil there.

Mr. Gould. They were cultivated?

Mr. Sias. Yes; they were known as the Windom Dewberry, or Cook's Hardy Dewberry.

Mr. Smith. Mr. Pearse states he has seen both varieties growing and I would inquire as to their shape, size and color.

Mr. Pearse. The Lucretia was the largest, but the Windom is much more productive. The shape is a little oval. I grew them last year.

Prof. Green. Do you think they would be profitable as a market crop?

Mr. Pearse. I think the Windom will be very profitable indeed. I plant them in rows, with the plants set two or three feet apart in the row; cultivate thoroughly, but carry the runners around in matted rows. The fruit comes out on the top like strawberries. I only put mine out last spring. Those I saw in bearing that I referred to were grown by Mr. Stubbs, of Long lake. I raised a few last year and expect a nice crop another season. I would put them on the poorest ground.

Mr. Dartt. And make it rich?

Mr. Pearse. No, I would not.

Mr. Smith stated he had seen a fine crop of dewberries growing wild in the vicinity of Hamline in the summer of 1884, and had examined in the locality each year since but failed to find

any. He had been to Mr. Cook's place and examined the Windom and it resembled the berry just referred to. He had raised some fruit last year but found it a shy bearer. They might do better if covered until late in the spring.

Mr. Harris. I think the dewberry is a native over every part of Minnesota. There are patches of them in Houston county and have been for thirty-five years; in that time there have been three crops. This past year the crop was immense; they were laden down with fruit. We have two distinct species. Occasionally we find a plant a little different from those of Mr. Cook, but the majority have the same leaf and habit of growth. The Windom does not branch as much as the common, wild variety; Mr. Cook has fruited it every year with one exception. While distinct, it is a variety of the same species as the other. The trouble seems to be there is only an occasional crop produced.

Mr Pearse. I do not think the Windom is a native, but a foreign variety. It was no doubt brought here by the Mennonites.

Mr. Harris. Mr. Cook tells me the Windom has been grown in Cottonwood county from its earliest settlement and was brought there from Iowa. It has been cultivated so long it is difficult to ascertain its exact origin.

Mr. Sias. The man who introduced it would not state where he got it, but he came to Minnesota from Iowa, and Mr. Cook imformed me that it probably came from there. Mr. Cook is among the Mennonites and I am inclined to think it is a Russian variety, it is so different from the wild ones in Minnesota. There are thousands of wild ones on my place but they have never borne any good crops as yet.

Mr. Ridout. Some six years ago a tree peddler came to my place and induced me to believe that dewberries would be a good thing to try in this climate and to buy about a thousand plants. He said they were the best variety to set. I let them grow for two years and got them pretty well scattered, and if I was to take my choice of them or the Canada thistles I would take the latter, for they have taken possession of my garden. (Laughter.)

Mr. Urie. I think I was pretty near correct in my statement, if there has only been three good crops raised here in thirty-five years. The soil here is not adapted to them, nor the climate. It is a southern plant and belongs to the South. There it grows in great profusion. Plant it on a rock and I think you will succeed, but not on good soil.

Mr. Taylor. We have heard about the dewberry bearing regularly. In 1856, when I came to Minnesota, in the section of country where I live, there were no blackberries for eight or ten years About 1865 in the vicinity of Forestville they were very numerous, and people would come from miles around to gather them. But they have borne none to amount to anything since, either cultivated or any other way; so the dewberry is not an exception in that respect.

Mr. Harris. I think the reason why the crop is a failure in that locality is it is not as favorable as in some others. In our county last year dewberries were so plentiful as to spoil the market for tame berries. They produced so profusely we could not get rid of our tame ones at living prices.

Mr. Pearse. I think there will be no difficulty in growing the dewberry successfully all over the state.

President Elliot. I think if we have a native variety that will succeed here we do not want to import them.

A communication was received from Dr. S. S. Kilvington, superintendent of the health department of the city of Minneapolis, asking the Society to appoint a committee to confer with the board of health to consider the question of disposing of the city offal.

On motion of Mr. Smith the following committee was named y the chair, to-wit: J. S. Gray, F. G. Gould and Wm. Lyons.

The following letter was then read:

FROM CALIFORNIA.

ESCONDIDO, SAN DIEGO CO., CAL.. Dec. 10, 1888.

S. D. Hillman, Secretary, etc.,

DEAR SIR: Your favor of November 30th reached me in California, where I am located, having removed here the past fall. I do not know that anything that I might say in regard to this part of South California would be of any special interest to those who are laboring so hard to make a success in the cultivation of fruits in that section. I hardly feel that anything that I might say in regard to the cultivation of fruits in Dakota would be of any special benefit, or throw any additional light upon the subject, as much as I desire to see success crown your efforts.

I can but wish that your Society could hold its annual meeting in our beautiful valley of Escondido, which seems to me to be almost a paradise for the horticulturist, and I believe the most perfect climate in the world. As much as I had heard about this favored section, I was not prepared to find so perfect a climate, or such a profusion of fruits and flowers as are grown by, what seems to me, the most careless culture. I can but wish that those who have spent the best portion of their lives in striving to produce the fruits of a temperate climate in that cold and frozen north, might spend the remainder of their days in this land of sunshine, fruits and flowers.

Very truly yours,

E. DEBELL.

Mr. Pearse. Mr. President, those who want to may go to California, but as far as I am concerned I will say that I am perfectly well satisfied that if I will use the intelligence the Almighty has given me, I can raise fruit here without going there, or anywhere else.

Mr. Sias. I am acquainted with Mr. DeBell. He was president of the Dakota Horticultural Society and at the head of that society for some years. During that time he tried to secure an appropriation of $2,000 to carry on the work of that society, and if he had succeeded he might have staid there and the society would have succeeded. I consider his removal to California a great loss to Dakota.

Mr. Smith. The society is getting along all right yet without him.

Mr. Sias. That may be, but they won't succeed any length of time without they can get an appropriation.

Mr. Harris. I don't know about that; our own Society lived a good many years without an appropriation and we did very good work as a horticultural society. Of course it is always one of the most enjoyable seasons of our lives to get up here and have the sympathy of kind friends who receive us into their elegant homes, and to enjoy eating the bread and butter of the citizens of Minneapolis, and to have their good things placed at our disposal. (Laughter.)

PRIZE ESSAYS.

Mr. Pearse. Mr. President, in regard to the essays offered by the Society, I would suggest that they be read and passed upon by the Society.

Mr. Underwood. Would it not be well after the awards are made for the one that was successful to step up and read his own essay?

Mr. Wilcox. I submit if that would be the proper thing. On receiving the program I had the the matter of offering prize essays announced in our public schools at Hastings, so the boys might become interested in writing on the different subjects. I have five essays with me that were sent to file with the Secretary at the proper time. But if they are to be read by the parties writing them it would be only justice to them that the committees should make their reports so they could get here in time. It would hardly be advisable to compel parties from outside the state, for instance, to come here with the hope and expectation that they might be called upon to read the prize essay that they might have won.

Mr. Dartt. The reading of so many papers, it occurs to me would take too much time and should not be done. This prize is offered for the best writing and not for the best reading. It seems to me the plan pursued last year is good enough for the writers; that is, to have the committees read all the papers and decide as to their value. One on each subject might be read, and that would probably be enough aside from the discussion.

Mr. Pearse. Let the committees read them all and let the best be read; that is all I suggest.

Mr. Gould. I suppose the Society does not take the responsibility of publishing the successful essays in its transactions, but if published it is for whatever merit it may have in any case; the Society only indorse it in a general way. I therefore think it better not to have any criticisms passed upon them in a public manner but let them simply be printed in the report.

Mr. Pearse. I think the committee have power to reject any or all if they see fit.

Mr. Gould. Certainly; but I mean to say after they accept, if they decide to do so.

Mr. Pearse. They report, I presume whether to accept or exclude the essay and the Society decides the matter.

Mr. Wilcox. I do not see in what way the Society can give that construction to the premiums offered, so as to reject all of them; there must be some one of the number handed in that is entitled to the prize the Society has offered. I think the matter is not discretionary, and I say this in justice to the young men who have written essays at my suggestion; the best should receive a premium.

Mr. Harris. We offer these prizes for essays for the purpose of getting the rising generation to become interested in the work of horticulture and to set them to thinking and studying. We expect those who write essays will have to become close observers. And we don't expect to find that boys are perfect in practical horticulture. I was on one or two committees last year and we decided to award premiums in every case, and in the way the offer was made I don't know as there was any way to avoid it.

On motion the meeting adjourned till seven o'clock P. M.

EVENING SESSION.

TUESDAY, JAN. 15, 1889.

The meeting was called to order at seven o'clock P. M. by Vice President Sias, who stated the first in order upon the program for the evening, was the delivery of the President's annual address.

PRESIDENT'S ANNUAL ADDRESS.

Members of The Minnesota Horticultural Society,

LADIES AND GENTLEMEN: Another year has passed and we have come together once more in council, to glean from our diversified experiences such information and instruction as we have developed in our industrious investigations after wisdom and truth; desiring to weave into our historical record such facts, opinions and practical theories as we have been able to eliminate from Nature's great store-house of horticultural treasures, for future generations to re-examine, comment upon and perhaps criticise. We come feeling that we have found out only a few of the many intricate problems and possibilities in our several

special lines of work, but these we should willingly and freely impart to each other.

The dissemination of horticultural instruction and knowledge in the past has nearly all been by individuals or organizations similarly situated as ours; and very largely dependent upon the efforts and exertions of a very few persons, whose love, tastes, desires and interests inclined them to contribute their time, talents and wealth towards its advancement.

The progressive horticulturists of our country have great reason to be thankful for the spirit of interest manifested by the commissioner of agriculture in forming a division of pomology; also we should feel grateful to know our state superintendent of public instruction is trying to formulate some method whereby the children of our common schools shall be taught the first rudiments of this very useful, refining art — horticulture. If we could devise some expeditious method of propagating and increasing the horticultural missionary spirit among our members, by breathing into them greater ardor, and endowing them with greater courage, we should hope for greater immediate success in developing this industry, of so much importance to the future welfare and happiness of ourselves and children.

Our work as a Society thus far has been largely of a missionary character; trying to teach our brother co-workers a few of the simpler principles of success and how to shun some of our individual errors, failures, losses and discouragements; each vying with the other in trying to disseminate some new fact or opinion worthy of remembrance.

When we look back over our past history and note the advancement that has been made in horticulture, we have great reason for congratulation and inward pride in knowing that this time has not all been spent in vain, trying to forward the interests of an industry of so much worth and importance. All of us may not have used our talents or our efforts to the best and wisest end, but have tried to do something in our particular lines of work.

Pardon me for taking a retrospective glance to the colonial days of this great republic, and quoting a few facts from the reports that have not been placed upon any page of our state horticultural transactions:

"The first production of the soil which our forefathers found when they landed on the cheerless shore of Massachusetts Bay, except the leafless forest trees of December, was some seed of

that noble plant, the maize (more modern name, corn), which not only saved their lives, but in all succeeding generations has been a prime factor of their sustenance and of their prosperity. The native fruits they found the year following were the grape, white and black; strawberries, raspberries, blackberries, blueberries, huckleberries, barberries, cranberries, crab apples, plums, nuts and a profusion of roses; but the apple, the pear and the peach were not indigenous to this country, and a civilized hand had not stretched across the wide Atlantic to sow their seeds.

"On the tenth of October, 1639, the first pomological exhibition in the United States was held in the city of Boston, the fruit being brought from Governor's island in the harbor, there being not one apple or pear tree planted in the whole country but upon that island. It was here, five years after the landing of the Pilgrims that the first free school was established, which together with the church still lives."

These reminiscences are wonderful reminders of the march of progress that has been wrought in these two hundred and forty-nine years in this fair land, where but a little while ago the governor of the Bay State said: "In 1822 we were utterly destitute of nurseries in New England for fruit trees on an extensive scale; we have no cultivators on whom we can call for a supply of the most common plants of the smaller fruits, such as strawberries, gooseberries and raspberries of the superior kinds; we have no place to which we can go for plants to ornament our grounds; we have not a single salesman who can furnish us with fresh annual seeds on which we can depend and place reliance." He added, "Shall it be said that from June to September a traveler may traverse in Massachusetts from Boston to Albany, and not be able to procure a plate of fruit except wild strawberries, blackberries and huckleberries, unless from the hospitality of some private gentleman."

OUR STATE HORTICULTURAL SOCIETY.

The relative relation and attitude of this Society towards all other similar organizations in our state, is a question of great importance at this time for your wise consideration. Our interest and solicitude in the welfare and prosperity of all kindred horticultural organizations, furnishes us good grounds for seeking more friendly relations and intercourse with all societies of

specialists and their members. Our past history, as an incentive, invites us to greater exertions in promoting the development of these interests; and when it is considered what our record has been in the past and the bright prospects in the future, we trust there will be sufficient inducement to our brother co-workers, to come in and join in adding better and greater facilities for spreading knowledge and instruction among our fellow citizens.

This name of ours — State Horticultural Society — would if considered in its broadest sense, seem to imply that its membership should be composed of all those whose thoughts, tastes and desires were inclined towards diligent research for the promotion and development in all the divisions and subdivisions of every kind and nature in the horticultural industry, that depends upon the tillage, cultivation and growing of plants from the soil, either in field, garden or conservatory and should be co-operative. As a general rule this is the case; but I am sorry to say there is a tendency among horticulturists in certain specific lines of work, to devote their time and attention exclusively to their immediate interests and self-culture, and to withhold their counsel and support from every other organization whose investigations do not render special and particular effort to aid or assist them in their especial branch of business. Singleness of purpose and action in an individual is commendable; but would not be expedient or admissible in the guidance or managing of a large body of persons organized for enlarged and combined work.

Each class of industrial education should be distinctive in its application and impart a genial influence upon all mankind, calling out the finest qualities of perception. In the skillful management of the many varied forms of plant life, considered from an æsthetic standpoint, its teachings should be elevating and refining in all its theory and practice, and call for delicate distinguishing qualities in all its manipulations. The mind that guides the hand and actions of the true horticulturist, should be amply furnished and enriched with all the keenest susceptibilities of intelligent research.

Experience is the great teacher of mankind; and he who would attain the greatest perfection in his calling, should seek each and every opportunity for improvement. All classes of horticulture in the state, should become associated together in common sentiment and purpose; all differences of opinion should be overcome and there should be a union of interests for the welfare and

prosperity of each organization. This holding aloof of one branch of industry from another, is not and never can prove of permanent benefit to either society. To illustrate: Suppose the nursery and tree men should wish to pull in one direction; the florists and plant men in another, and the small fruit and vegetable men in still another; what would be the consequence? Each special class would be engaged in their own particular kind of work. Would they accomplish as much good for the benefit of the people and public at large and for themselves, as if they were to support one central organization? The friends in all of these sub-divisions of horticulture can not afford to become exclusive and dwarfed in their ideas, their interests divided, separated, or disunited by pulling in different directions.

There is an erroneous impression which has gone abroad, that this Society is ruled, or governed for promoting and advancing the aspirations of some one man; and guided and directed according to the ideas, desires and dictates of a small class or set of men; for elevating and pushing to the front some one division in horticulture, to the exclusion and detriment of another. But such is not the case. We wish it distinctly understood that we are striving and working for the best, largest and furthest reaching results in all directions. We wish to improve, beautify and adorn our minds, homes and surroundings, with all the taste and elegance possible, rendering to each and every person respectful and refining influence according to their character, worth, and ability. What more than this would you have us do? We leave it with you to choose your path of duty.

INSECT PESTS.

Parasitic and fungoid diseases are still to be contended with and in many portions of the country are on the increase and call for greater activity in preventing their ravages. While they are rough on the unskilled and careless cultivators and cause them to be discouraged and disenheartened in their business, they prove a blessing in disguise to the intelligent, alert and progressive culturist, and enable him to get an increased price for his product.

The call for larger and broader intelligence in all classes and divisions of horticultural work is increasing each year; as the country gets settled up and new sections and fields become scarce for planting, we more and more see the inroads of these little

depredators that seem so insignificant and small, yet give us any amount of trouble and loss. We need to be alarmed and looking about us, for the enemy is already in our midst.

In referring to the rust and mildew on grapes, the commissioner of agriculture says: "The different kinds of rot — black rot, brown rot, white rot, and bitter rot — are caused by fungi; each form being produced by a special fungus, quite distinct from those under whose action the other forms appear. These fungi are plants like the vines themselves; differing from the latter only in their minute size and in their habits of growth; and there is a much greater difference between the fungus which produces the black rot, and the fungus which causes the bitter rot, than there is between the most widely different grapevines which you cultivate."

Black rot or going to decay of grapes is purely the result of the attacks of a parasite on fruit and foliage alike. The use of preparations of arseneous poisons sprayed upon the foliage just after the fruit has set, and at different stages of growth, is a preventive for these many kinds of diseases; not only these but the codling moth and other injurious insects are destroyed; in some instances saving seventy per cent of good fruit, where without the aid of these sprays the whole crop would be a total failure. New kinds of liquid and powdered remedies for prevention of plant and fungus diseases are making their appearance each year, and should be sifted by discussion to discover which are the best. We are very apt to take up with new ideas and remedies without investigating their real merits. Our investigations in this line should be thorough and cautious; for already there are many complaints that injury has been done to our plants and vines by using too large an amount of remedy and too little good common sense.

As the country grows older, the losses and damages to all varieties of plant life are certain to be increasingly great. One writer suggests we should not denounce all insects that are injurious to our crops as an ungrateful nuisance and evil. The horticulturist would be a very unenergetic and unambitious being if he had no insects to contend with. "Verily the bug" said he, "is a very useful member of society, whether he is a big or a little bug; he keeps us horticulturists up and a going, and teaches us if we will have what our appetites crave most ardently, and will surround ourselves with abundance, we must work for it; in other words, be honest and industrious."

Our enlarged acreage of vines and other fruits makes it imperative for us to consider well what preventive measures should be adopted against the many forms of noxious diseases that give warning of the encounter we must sooner or later meet in the protection of all kinds and varieties of fruits from being destroyed. Eternal vigilance in guarding against the little foxes that cut the vines, is to be the price by which we are to prosper and save to ourselves a profitable harvest.

LIBRARY.

Your attention is called to the pressing needs for a suitable depository for our horticultural library, which is increasing each year by exchanges and new books added. It has been made more apparent at this time by the receipt of the following note from our librarian, of Sept. 30, 1888:

DEAR SIR: The fire at the agricultural building of the state university makes it necessary that our reports be removed at once, as they are now quite wet.

(Signed) E. A. CUZNER.

On examination we found that none were destroyed by fire, but many were damaged by water, and will need rebinding before they can be of use; thus it becomes imperative that we should determine on some definite action for procuring a repository that will be ample and secure. Our published reports are numbered by the thousand, and each year new accumulations from our own published reports and accessories by way of exchanges with other societies are received; and this question arises, where can they be placed secure from fire and damp air? These agricultural and horticultural books that we have been collecting for the past twenty years are of value to the members of this Society, and are the silent monuments of our work in horticulture, giving the recorded history of our members and Society. To many of us this history is precious, and must be preserved to tell future generations of our life work when we are laid away to our long rest.

In furtherance of this object, I would recommend that a committee of three be appointed to select and report at this meeting a permanent library committee, whose duty shall be the procuring of a suitable place for a library; to gather and arrange such books, periodicals and other property as may now belong to our

Society, and to collect and add to as fast as possible from all available sources.

PREMIUM LISTS AT STATE FAIRS.

From personal observation and experience gained while acting as superintendent of Division G, Fruits and Flowers; Division H, Vegetables; and Division I, Sugar, Syrup, Honey, Bread and Domestic Pantry Stores, I have come to this conclusion, that combining and treating of these three divisions (whose interests are naturally more or less the same) in one building, under the care and guidance of one general superintendent, was a wise and prudent decision. The educational points derived in the management of this department in the last three years, have been many and valuable; and it is said that he is a dull scholar who can not discover some occasion for improvement after repeated exertions for the attainment of any special object. The present relations existing between the officers of the State Agricultural and Horticultural Societies, are very cordial and harmonious, and it is hoped may ever remain so; but from the experience had in conducting the affairs of the Horticultural Society, we are convinced it is not well or conducive to the best interest and prosperity of our Society to always remain in this passive position. We do not wish to censure, find fault with, or cast any reflections on anyone for the manner in which our Society has been dealt with by the state agricultural board in the past. They have been very munificent with us as a society, in adjusting the premiums and prescribing the management of our fall exhibitions. Still there is a feeling among many of our members that we are not receiving that recognition that should be accorded to us for all the endeavors and efforts we are making in trying to advance our interests and secure larger and better facilities for holding more varied and more successful horticultural and domestic exhibitions. Under the dictation of the state agricultural board, without any voice in its counsels, we have not accomplished all we could wish or desire; and never will until this Society has a broadgauge representative member, qualified to vote and take an active part in the management of all its affairs.

I present a few suggestions for your consideration as to the advisabililty of revising our premium lists, and you can do with them as you choose.

First—That there be a committee of five persons appointed, representing all the diversified interests included in these three divisions (G, H and I), who shall have charge of the revision of the three premium lists for the coming year.

Second—This committee be instructed to correspond with officers of similar organizations and prominent horticulturists in other states, seeking information concerning premium lists, management and the most suitable furniture to be used in conducting horticultural exhibitions.

Third—This committee be instructed to issue a printed circular inviting written suggestions from all former patrons of our exhibitions, and others who are or may be interested in the prosperity of the State Horticultural Society.

Fourth—That the actual expenses of this committee (services of committee not included) be provided for, out of the funds of the society.

Revision of premium lists should be attended to by a competent committee of three persons, one from each of the three divisions, G, H and I. There is manifest dissatisfaction among exhibitors at the way our list now stands; they think there are too many premiums on single varieties and not large enough on collections. From the experience had the past season at several exhibitions where the classes were only divided into five graded premiums, the effect has been most satisfactory; bringing out much larger and finer displays, than by the old method of dividing into small sized amounts; large premiums always bringing forward a larger number of competitors, than the old method.

DISTRICT OR COUNTY SOCIETIES.

Local horticultural societies should be encouraged, and their number greatly increased; we should be looking forward to the time when we can aid and assist such organizations; for here is a true missionary field for labor, one that ought to be cultivated most thoroughly in the interests of progressive horticulture. We should have four district and a local society in every county in the state which should be auxiliary to the State Society. How can we do this, unless we have greater facilities placed at our disposal, and an increased appropriation from the state?

The organization of district and local societies is attended with some expense, and at present we can not give such assistance as is needed; only like the "impotent man" I am afraid

we shall have to wait until someone can help us step into the whirlpool, seeking state legislation for aid.

FARMERS' INSTITUTES.

Within the last few years there has arisen a demand among the modern agriculturists and horticulturists of our country, for enlightenment and instruction, that will encourage, improve and fortify their minds in guiding the hand of utility on all characteristic and useful points, governing mechanical and manual employments in all the variable and versatile departments of every day work on the farm and in the garden. To meet these modern ideas and desires, the farmers' institute was created; and through this means there has been opened up to us a new field of opportunity for presenting to our rural population a few of the elementary principles of horticultural art.

Before this institute teaching was inaugurated, we had very inadequate means at our disposal for diffusing intelligible instruction in gardening and fruit raising among our farmers, except through our limited supply of annual reports and a few stray items in the agricultural press; and now we could not accomplish much if it were not for the valuable individual services rendered by a few enthusiasts in horticulture. These have rendered helpful assistance, counsel and instruction, such as they in their wisdom were qualified to present on special subjects pertaining to their occupation.

It is with pleasure that I call your attention to the record of the second year of the institute's work in this state, by our very able and efficient superintendent and his assistants. Through this channel there has undoubtedly opened up a new field for presenting useful horticultural instruction in all its many varied phases to an apprentice farming population. And I would heartily recommend that some action be taken by the members present that will furnish us with means suitable for instructors which will give greater efficiency to our particular portion of the institute work.

AGRICULTURAL EXPERIMENT STATION.

There are several matters of vital importance o the interests of the horticulturists and agriculturists of our state, that follow in the direct line of experimental work, and which should be consid-

ered with sound and cautious judgment by every member in this organization. The central station has been placed under the guidance and direction of the board of regents, who have appointed a director who has during the past year, put it into successful operation. The school of agriculture has been successfully opened and more applications of students for admission have been received than can be comfortably accommodated. None are turned away, but temporary provisions made for all. I understand there are forty students in attendance, with more expected every day.

Our agricultural experiment station is now fully equipped in buildings, instruments and men, for the work which it was designed to accomplish, and every department is in successful operation.

The results of the work so far as completed, have been given out in the quarterly bulletins, four of which have already been issued, and the fifth will be ready for distribution at this meeting to members of the Society. The annual report of the station is now in press, and will be completed at an early day, or about April 1st.

At our last annual meeting there was some discussion in regard to auxiliary stations to be established throughout the state, but no definite plans were indorsed by us, or have been by the board of regents; neither has the director been empowered to put the suggestions which were made at our last meeting of the Society, into practical operation. There were no objections to the plan proposed, excepting the fact of having too much work on hand for the year, pertaining to the organization of the central station, to make it advisable to enlarge the field of operations; but I am more and more convinced that such action will be demanded at an early day, and it will be much better for the university to inaugurate this measure than to have the matter forced upon them by legislative enactment. But from the position of your president, acting only as an advisory officer, under the direction of the board of regents, we can do no more than make suggestions and leave the responsibility to the ruling power.

I think we can aid this matter materially by emphasizing the importance of this work, and asking for a decided expression of opinion upon the part of the Society.

I think it would be within the province of this Society to make inquiry from the director of the state experimental sta-

tion, if a competent corps of persons to govern the county experiment stations have been secured; and if so, should we not have a list of the same for publication in our transactions? If not, it would be well to consider who are the most efficient and the best qualified in each county, to undertake the work in special lines of agriculture and horticulture, to become correspondents and observers for the central experiment station, etc.

PLUMS.

New and improved varieties of plums are each year coming forward for favor; some will prove of value while others will be of little value. Among our native plums are some that are attracting attention from abroad. Charles Gibb, of Abbotsford, Quebec, says: "My special hopes are now turned to the improved varieties of the Northwestern states; I have fruited the De Soto, and found it an advance on any I have tried. I have more hopes of Northwestern plums from my own experience and from what I have seen in the West, than I have of even the Russian plums."

This from so good an authority should give our own fruit growers great encouragement in plum culture. We should make systematic efforts to secure every kind or variety of plum of value and place them in our state experiment grounds, that their relative merits may be made known.

There are many trees growing wild in our thickets that if transplanted and put under thorough cultivation, would yield valuable fruit worthy of general use. There are other native fruits that with the right kind of treatment would develop into varieties of great value to our fruit growers. The blueberry is, we think, susceptible of improvement and should be thoroughly tested at the experiment station. Some varieties of our native cranberries are exceedingly fine in size and color and possess other valuable qualities. We should seek and search every nook and corner of this great Northwest for new and hardy varieties in all classes of fruits and plants that would be of added value to what we now have.

AMERICAN POMOLOGICAL SOCIETY.

The next meeting of this grand old society will take place at Ocola, Florida, Feb. 20-23, 1889.

This Society should be represented by one or more delegates. We need to sustain our friendly relations and fellowship with the organization that has done so much in educational horticultural art, not only in this country, but is quoted as authority all over the world.

NECROLOGY.

Chas. Hoag, one of the original charter members of this Society, died Feb. 2, 1888, in the eightieth year of his age. A full and appropriate account of his honorable services as an agriculturist, horticulturist and respected citizen, is given in our last report, on page 113.

Robert Hale, secretary and treasurer of the Minneapolis board of trade, an honored and useful member of this Society, has also died during the past year. As an amateur horticulturist he was fulfilling the divine law of doing his duty faithfully and well; his memory will always be held dear to the members of this Society, remembering him for his many genial, sterling good qualities as a citizen and horticulturist. Fuller reference will be given to his life and death by the obituary committee.

FOREST TREE CULTURE.

There is a very erroneous impression among young people, and many old ones, that governments ought to do all the planting in forest culture; they thinking that mens' lives are too short for such work; also that the planting of trees, even if successful in growth, is a very uncertain investment to the planter. Life is very uncertain, as statistics inform us; not more so than a great many other things that we do. All prospective operations have clustering around them many uncertainties; but really, in what can a young man invest a few dollars that will give him so much real enjoyment in his old age, as the planting of a goodly number of useful and ornamental trees and shrubs? In your youth plant trees; in middle age plant trees; in old age plant trees, that they may spread their ample shade over your head when silvered with old age.

Intelligent, useful men are trying to solve the problem of reforestation of our continent. The work may not be done in this generation, but it will surely exercise the most thoughtful intellects of this land until it is accomplished. This great scheme has

come to stay with the best free educators of our land. There will be discouragements and dark days for this enterprise, but it will end in either the government or private capital undertaking this great work.

It is hoped that every member of this Society has enlisted in this great cause for life; and will never let go of the idea that forests should be protected, and new plantations made on all unoccupied waste places, to be of benefit to some one; if not to ourselves, to the generations to follow.

Trees like men begin to show age and decay at the top; but men unlike trees, return to their second childhood, and if an active, useful, energetic man in youth, they never lose opportunity for doing or saying something as a source of pure enjoyment; and I would inquire what more impressive scene of unalloyed sacrifice, than this useful employment in planting trees in their declining years for future generations to admire; living monuments that shall long remain for our children to appreciate; silent reminders of thoughtful, industrious usefulness!

I can give no more fitting words perhaps as a closing valedic tion, than a quotation from a charming fable written two centuries ago, by La Fontaine, from the Montreal reports of 1881; it runs thus:

"An old man of eighty was planting some trees,
Three lusty young neighbors drew near —
'To build would be odd, but still stranger to plant,
Our friend has grown foolish we fear!
In the name of all conscience,' said they with a smile,
'What harvest for you will these bear?
Your age of four-score has no future to boast,
Why cumber it thus with more care?
'Tis only for you to repent of the past,
Throw future designs to the air!'

"The old man looked up and sagely replied:
'You speak of my hopes and your own;
Life's enterprise often is left incomplete,
Though begun on the threshold of youth.
For fate unrelenting may sport with your hopes,
As much as it may with my years.
The chances of life render equal its span,
Though unequal to youth it appears.
And which think ye, the last of the four,
Will behold the bright rays of the sun?
Does this moment assure you another is yours
To finish your labors begun?

" 'The shade of this tree
Though perchance not for me,
For others a blessing may shed
As under its branches they tread.
Nor would you forbid
The prudent provide
For others who follow. Howe'er you deride,
Such fruit of my toil, each day I enjoy,
As daily for others my strength I employ;
And who can explore,
What Fate has in store?
For old though I be, with regret I may see,
And mourn over your premature graves.' "

The reading of the President's address was greeted with applause.

On motion of Mr. Cutler a committee of three was named by the Society upon the recommendation of the President, as follows: J. M. Underwood, J. S. Harris and M. Pearse.

The following paper was then read by Mr. Cutler:

MINNESOTA LAW ON NURSERY FRAUDS.

By M. Cutler, Sumter.

Mr. President, Ladies and Gentlemen:

The golden rule is to do to others as we would that they should do to us. If all men obeyed this rule there would be no necessity for the existence of such a law as now graces our statutes in reference to fraud in the sale of nursery stock. But so long as men will allow greed and avarice to cause them to lie, misrepresent, deceive and defraud their fellow citizens so long will such laws be required. I feel thankful there were good and true men enough in this Society, who had the interests of our hard working farmers and laboring men at heart to compile and push to its final passage so good a law as we now have. All honor to our committee and such men as Senator Hoard and Representative Donnelly who assisted in its passage.

While this law is not quite as rigid as some of our rural friends would like to have it and some of its provisions may work in-

justice to our home nurserymen, the spirit and intention of the law is right, and there is abundant proof that its effects have been beneficial. For instance two or three years ago thousands of dollars were paid out in McLeod county for worthless Ohio and York State apple trees, at ten dollars per dozen. This year nearly every farmer has from one to four barrels of apples in his cellar, not from those trees, but from money that without this law might have gone to some rascally tree agent or dealer.

I have been informed by our Secretary that few complaints come to him since the passage of the law, and we believe it has proved quite satisfactory to the majority of the people of our state and the members of this Society. Still according to our last annual report I find that there are a few who think it all wrong and want it repealed and the old condition of things restored.

This law although threatened by a committee of nurserymen in Chicago has not been set aside and whoever violates its provisions I understand is a lawbreaker and subject to prosecution under it.

To properly show the necessity for some such law it becomes necessary for me to refer to the condition of things previous to its passage. During the years of 1885 and 1886 a band of tree agents (working for different tree dealing firms) with more cheek than an army mule and destitute of all principles of manhood and honor, made a raid upon the people of the Northwestern states, selling budded apple trees grown in Ohio, at one dollar each, Gideon apple trees from New York, Arctic plums, gooseberries and strawberry plants at the same style of prices. They also imposed upon our foreign-born citizens who had recently made their homes with us and who were unused to the ways and peculiarities of this country, by selling them peach, plum, prune and pear trees at outrageous prices. Complaints of their depredations not only came from our own state but from Iowa, Dakota, Illinois and Wisconsin.

At our meeting in 1885 an effort was made to get a simple resolution passed by this Society, denouncing their operations, but without success.

During the season of 1886, the cheeky transactions of the agents of L. L. May & Co., caused so many complaints to be made to the President and Secretary of this Society, that these officers, in their address and report, called attention to the necessity of the passage of a law for the prevention of such

wholesale swindling. A lengthy discussion followed which resulted (with little opposition from members) in the appointment of a legislative committee, and the preparation and passage of the present law, which was carefully prepared and passed upon by the attorney general and judiciary committees of the legislature. If there has been any injustice done to honest nurserymen, it was not intentional. Had the nurserymen of the country in their conventions, condemned the actions of the tree dealers and agents, instead of condemning and threatening our law, they would have merited much more of our confidence. If it is their intention to persistently defy and violate the law we now have, we warn them to halt, ere the fate befalls them which, it is reported, has overtaken a man who took fifty or sixty thousand wild orange trees to California, and is now in durance vile. The temper of the people is in no condition to be trifled with. Had justice been done to some of the tree dealers and agents who came into this state, they too would have been behind prison bars.

As our society is partly supported by taxes collected from the people of the state without regard to occupation, it is therefore our duty to manage it for the benefit of all and not for a few tree growers or sellers.

A word to the nurserymen. The men in other occupations who become successful do so by being honorable and upright in their business and if we follow this course people will soon learn who to deal with, and we will have a clear conscience and carry as much filthy lucre to the grave as those who do otherwise.

It has been said that a man can not send out of the state for a few Jessie strawberry plants for his customers without violating the law. This may seem rather hard and may be wrong, still observation has convinced me that few of those who buy new kinds of strawberry plants at two dollars per dozen and new grape vines at two dollars each ever make them live or get any profit from them.

In conclusion, fellow members, let us treat this subject carefully and with a just regard for the interests of all our citizens.

DISCUSSION.

Mr. Barrett. Mr. President, I would like to inquire in your judgment whether there should be any effort made in the present legislature to repeal the law to which the writer alluded

in his address? There are parties outside of our state, no doubt, who are deeply interested in the repeal of our law, and there may be parties within the state who will seek for its repeal. It seems to me there should be some officer or some committee of the Society appointed to look after this matter in case such an attempt should be made. I wish to add that in my section of the country, in Traverse county and round about, there have been no agents who have been there and practiced their deceptions upon the people of the community to my knowledge since the enactment of that law, and the people have really got their eyes open. There have been heretofore practiced upon the yoemanry there a great many deceptions, schemes and frauds, and the result is people have become shy and very circumspect under the protection of that law. Possibly there may be some defects that may need to be remedied. But if anyone should undertake to test the constitutionality of it it seems to me it becomes us to be on the alert, in order to maintain the law and protect the people of the state.

Mr. Harris. Mr. President, wherever I have been around in the state, the general verdict of Minnesota tree planters is that the law has been doing good. One disadvantage, perhaps, where trees are wanted that are grown outside of the state is to get them, but where trees or plants are wanted in small quantities, orders are sent direct to the grower for them. If the farmers of Minnesota would make a practice of getting a catalogue and making their own selections of stock, there would not be any need of agents.

I should be in favor of retaining the law. Perhaps in the course of time there should be some features of it amended; I think as a whole it has worked a great good. For two years in Houston county, where I live, we have been free from those agents who come through selling trees from Ohio and other points, who make people think that they have found a new kind of prune, or something of that kind, that came from Russia. They don't tell them that it came from the southern part of Illinois, or take orders any more at such high prices as they used to do. The law has had the wholesome effect to keep out that class of dealers and the agents have commenced doing a legitimate business.

Mr. Gray. The gentleman who read the paper tells us something about not being able to get Jessie strawberries outside of the state. What does that mean? If there is a law in this state

that has the effect to deprive us of getting a new thing I think it is about time we were rid of it. If we haven't got sense enough to look out for ourselves and find out the good things that may be produced in other states, I make a great mistake in the people of Minnesota. I should like to know for information if we have a law that is so contrary to our own interests as that. I do not know anything about what it contains for I never read it.

Mr. Harris. The law does not prevent a man buying just where he pleases.

Mr. Sias. I think Bro. Harris is correct. I think the agitation of this question has resulted in much good.

Mr. Cutler. The point made in regard to sending out of the state for plants is this: Under the present law, if the dealer sends out of the state for plants and re-sells them he has to take out a license, as I understand it; that is, go to the secretary of state and give bonds in the amount of $2,000, I believe, and take out a license. Some think this is a hardship to the home dealers to require them to take out a license in order to do this. So far as individual planters are concerned they can buy direct from the grower as many plants as they may wish for their own use.

Mr. Terry. Mr. President, I would say the way my orchard stands I have very little to boast of; I bought my apple trees when I knew very little about our nurserymen, and got southern trees. I found out afterward it would have been better for me to buy them further north. I supposed my trees came from Sioux City but what was my digust upon making inquiries, to find they came from Kansas. And now as a Minnesotian I ask for protection. I think this association has done well in this direction. You have not obtained a perfect law, but at the same time I believe that all the members of the State Horticultural Society should support the efforts that are being made in this direction and accord their confidence in those who have been active in this direction, for their good intentions. I am only one out of hundreds that take this same position.

Mr. Pearse. Mr. President, I have a copy of the law before me and the essence of the law is in the title, which is merely this: "An act to prevent the practice of fraud by tree peddlers and commission men in the sale of nursery stock." That is all there is of it. That doesn't touch a nurseryman in Minnesota.

President Elliot. Not if he is honest.

Mr. Pearse. I went to a lawyer I consider the best in the state. I showed him the law; he said it didn't touch a nurseryman in Minnesota. There is the law in the title and that is the whole of it. That is the way it stands.

Mr. Underwood. I don't think the nurserymen are finding any fault with the law at all, either in Minnesota or anywhere else, except as it may be a little more difficult for foreign nurserymen to come in here to sell their stock; that is to say, they must give bonds for good behavior. They may come just the same, if they want to. I really think it may be an advantage, as it may help people to know what they are buying. I think it would be a good thing to have a law passed to protect men in horse trades. Every time I trade horses I get swindled (laughter); and I have got to get my eye teeth cut to know how to take care of my side of the bargain; but when I know as much about trading horses as I do about trees, why I won't get swindled so much. But unless they do pass some law to protect me on this horse-trading business, why I must go to work and learn how to do it myself.

President Elliot. We have had this tree law up in all phases. Last year we devoted seventeen pages in our reports to its discussion and I don't think it amounted to very much. The law seems to be working first rate. We all know there are some defects in it; but it is the best thing we could get at the time. If we attempt to tinker with it this year, or if an attempt is made to repeal it, our legislative committee must be on the alert and look after it to see that they don't deprive us of all we have accomplished in this direction. The question arises whether we will continue the present law or try to make some improvement in it.

Mr. Cutler. In order to bring this subject to a termination I will move that a committee be appointed to look after this matter.

Mr. Harris moved, as an amendment to the motion, that it was the sense of the State Horticultural Society that the present tree law should be retained on the statute book and that the legislative committee be instructed to see that no action is taken for its repeal.

Secretary Hillman stated that he had recently conferred with Mr. Mattson, secretary of state, with reference to the workings of this law and had been informed that it appeared to give very good satisfaction. Mr. Mattson stated that he had taken it upon

himself, at the request of parties interested, in one or two instances where complaints had been made as to sales of nursery stock, to obtain the facts as to the alleged grievances; that in each case the nurserymen in question had made satisfactory arrangements with the parties when his decision had been made in the matter. He had stated further that he thought it better instead of placing the responsibility with the secretary of state for the administration of the law, to place the whole matter in the hands of this Society, through its officers, as they were more thoroughly conversant with such matters than the secretary of state could be, in connection with his other numerous duties.

He said there was a law passed in Kansas nearly three years ago, for the prevention of fraud in the sale of fruit trees and nursery stock. The act declares any person who shall violate its provisions shall be guilty of a misdemeanor, and shall be liable in a fine or imprisonment, and treble damages to the party injured.

Mr. Gray called for the reading of the Minnesota law of 1887.

The motion of Mr. Harris was then adopted unanimously.

METEOROLOGY AND FORESTRY.

Prof. W. H. Ragan, of Indiana, was here called upon to present some remarks and to illustrate, by means of charts, the course of the great storm of January, 1886.

Prof. Ragan. I would say, Mr. President, I have an axe to grind.

President Elliot. Did you ever know anyone to come to a horticultural meeting that hadn't?

Prof. Ragan. I want to say something to you gentlemen on the subject of a remarkable blizzard, and how it effected the territory over which it passed.

Mr. Cutler. Do you mean to say that you are going to inform us here in Minnesota about the effects of blizzards?

Prof Ragan. I have a request to make on behalf of the people in my section of the country, that since you have the gate-way through which these blizzards are to pass that you shall look to the closing of the gate, so to speak; in other words, that the forestry question will figure somewhat in that which I have to say,

for I have no doubt that you are competent by tree planting to effect our climate favorably. It will not be done by this generation, probably, but by the good old man, that your President has referred to in his address, who in his dotage plants the trees of which future generations will reap the reward.

The effects of climate on organic and inorganic matter is fully recognized, especially by the horticulturist, for who is more concerned than he? The natural causes that produce the most violent climatic changes, and therefore, have the greatest effect upon animate and inanimate matter, are not well understood. If our continent were a level unbroken plain, from the tropics to the arctic regions, a given parallel of latitude would more nearly represent the character of the climate belonging thereto. As it is, when we trace the isotherms, or lines of mean temperature, across our continent, we find them very eccentric in their courses, apparently having but little respect for latitude. This fact is most forcibly illustrated by the movements of such storms as we now have under consideration and for the designation of which a seemingly appropriate word, blizzard, has been coined, and awaits adoption in the next edition of Webster.

The atmospheric conditions that precede a blizzard, indeed constitute the preliminary features of it, are a low barometer, centered well south and moving northeasterly. As a rule, we have from 8 to 15 low pressure movements during a month. Almost without exception these pass out of the territory of the United States through the lower St. Lawrence valley. Just why this is so need not now be considered. Usually these centres of low pressure arise in the Rocky mountain regions of the United States, or enter our territory from Manitoba, and, passing through or near the great lakes, follow the St. Lawrence to the northeast. Conditions of this kind may bring us, in the Central Mississippi Valley, thunder storms, heavy rains or snow, wind, and even tornadoes; but will not give us a genuine blizzard in all its fury with a resultant temperature of from 15° to 30°. If, however, an an area of low barometer enters the territory of the United States from the Gulf of Mexico and passes northeasterly toward he mouth of the St. Lawrence, and if this be during the winter months, we may have a severe cold wave extending far into the south, and borne to us in the latitude of Indiana and southeasterly, by winds from the west or even the southwest.

In some particulars the storm under consideration has excelled any on record. This is especially true in regard to its extent and

unusual severity in the extreme south. When we refer to the records of the signal service we ascertain the causes of this unusual distribution. As stated above, certain barometric conditions are the prelude to such storms. In this case (and this is but the type of all such storms), a low pressure of unusual energy came within the range of observation near Los Animos, Col., at 3 o'clock, P. M., Washington time, on Jan. 6, 1886, from which point it moved southward into the Gulf of Mexico, where it was central at 3 o'clock, P. M., of the seventh; from here it was deflected to the left, being noted eight hours later over the mouth of the Mississippi river, and thence it passed northeasterly, following the gulf and the Atlantic coasts, reaching the mouth of the St. Lawrence at 7 A. M. of the tenth.

An area of low barometer may be illustrated by, if not compared to, a vigorous blaze in a burning building, which creates a rarified condition of the atmosphere and a consequent rush of surrounding atmosphere to fill the void. In the northwestern portion of our continent, in the elevated regions of the Rocky mountain chain, we have a comparatively constant high barometer. When a low starts up, a corresponding high, from this region of constant high, flows in to fill the vacuum.

Farther north, in the arctic region, may be found as a constant or passive element, a low temperature. Without a disturbing cause, this condition of low temperature will hover about its proper latitude. When, however, a low barometer, which is always accompanied by high temperature arises, a high barometer moves into its wake, thus pruducing currents of cold air from the arctic region, with a resultant lower temperature. If this low barometer passes through the central or northern portions of the United States it is easy to understand why it should not draw a volume of cold air into the southern portion of the country. But when the reverse is the case, as was true of the storm under consideration and especially if the low has unusual energy and force, we may certainly expect the whole country to be overspread by a sheet of cold.

There are natural causes which direct and control the movements of such storms, when once inaugurated. If not, their movements would be direct and they would sweep down upon us of the Central Mississippi Valley, from the north rather than from the west or southwest. Hudson Bay and the lakes, to the north of us, with their stored summer heat, ward off these storms, pushing them, as it were, to the westward and against the

Rockies, where they follow in the lee of the mountains, which turn upward and beyond the reach of interference the warm currents from the Pacific, and, facilitated in their movements by the great treeless plains, until they reach the track of the preceding low barometer. As the low invariably moves to the northwest, the high, with its cold, naturally follows. Thus, we have the phenomenon of cold weather coming to us from the west or southwest.

You will readily see, from the facts I present you, how you, in common with the people of Dakota hold the gateway through which these storms must enter the territory of the United States, and how, by the suggestion already made, you may greatly ameliorate the climatic conditions of the whole country, for I have no possible doubt, but that through the reforestation of the great western plains, a very perceptible influence for the better may be wrought, upon our climate.

I will now hurriedly illustrate, by the use of a set of tridaily signal service charts, the movements of the storm under consideration. As already stated, you will notice the ink-spot on the chart in eastern Colorado, which marks the centre of the low barometer at 3 P. M. of January 6th. The dark wavy line across the upper portion of the chart, indicates the line of zero temperature, at that hour. The almost unchanged position of the zero line, in the lake region, during the prevalence of this storm will illustrate the beneficial influence they exert upon the climate, a fact which gives to Michigan and the surrounding territory, its just renown as a superior fruit growing section.

Turning to our next chart, which represents a period eight hours later, we find that the centre of the low area is now near Fort Sill in the Indian Territory, and that the zero line has dropped down, from Fort Custer to Denver, while all the Gulf region is basking in a temperature much above the frost point.

The next chart, which is for 7 A. M. of the 7th, represents, as you will see, the centre of the low barometer as near Indianola, Texas, and the zero line at Santa Fe and Fort Elliott, but almost unchanged as to the Lake region. The temperature of the Gulf coast is 40° and upwards.

This chart, which is for 3 P. M., shows the centre to be in the Gulf of Mexico immediately south of Indianola and off the mouth of the Rio Grande. The zero line has also dropped down, and that too against the tempering influence of the sun, from Fort Elliott to Fort Sill, while the temperature of the Gulf coast,

responding to the combined influence of the afternoon sun and the presence of the low barometer, which you have already learned invariably brings higher temperature, has arisen to 60° and even 70°. The orange orchardists of Florida were yet unconscious, unless warned through the signal service, of their impending doom.

At 11 P. M. of the 7th we find the low area covering the mouth of the Mississippi, and that the zero line has spread eastward to Fort Smith, Arkansas, from which point it extends due northward to St. Paul and the St. Louis river, where it turns eastward through Lake Superior into Ontario. The temperature has fallen in Texas to 30° at Indianola and Galveston, but is still 60° in Florida.

The chart for the morning of the 8th presents the low centre at Montgomery, Alabama, and the zero line extending from the Rio Grande below El Paso, Texas, by way of Palestine, Little Rock, Keokuk and Lake Superior. Temperature of Florida from 50° to 70°, while all of Texas is below 20°.

Eight hours later (the heat of the day) the low is in eastern Georgia, while zero has extended westward to the Mississippi river, but is receding in western Texas. The orange orchards are still unharmed in Florida, but are suffering in Louisiana. At 11 P. M. the low has reached the mouth of Chesapeake bay, and the zero line now takes in Memphis and northern Mississippi. The Gulf coast from Pensacola westward has a temperature of 20° and lower, but east and south Florida are above 50°.

The morning chart of the ninth shows the low area on the New Jersey coast, and zero extending from Santa Fe via Denison, Vicksburg, Chattanooga and thence northward to Cincinnati, Chicago and Lake Superior. Jacksonville and Cedar Keys have a temperature of 30° while Sanford and Punta Rassa have 40° and 50° respectively. At this observation we note the greatest thermometrical gradient that occurred during the storm, the readings being, at the centre of the low, in New Jersey, 28.8 inches, while on the northern border of your state it was 30.8 inches. The disparity of readings were unusual, which gave the storm its peculiar force.

The 3 p. m. chart shows the low on the coast of New Hampshire, with the zero line comparatively unchanged. The night observation of the ninth shows the low area in Central Maine with zero extending still more to the eastward. The temperature is rising rapidly in Texas and the southwest, but

still falling in Florida, having now reached 30° in the central part of the peninsula.

Our next chart represents the storm at its maximum. This is the morning of the tenth. The low barometer has now reached the mouth of the St. Lawrence, and the zero line extends from Utah, through New Mexico, Texas, Arkansas, Mississippi, Alabama, Georgia, North Carolina, and Virginia, and the line of 30° crosses Florida as far south as Punta Rassa.

The disastrous results of this storm, in the extreme south especially, are fresh in your memories. It is said that no such cold has occurred in Florida, as demonstrated by its effect on tender vegetation, since 1835, when they unquestionably had similar atmospheric conditions as the predisposing cause.

But the unusual character of this storm was manifested solely by its severity in the South. It has frequently been colder here, or even where I live, in the last half century, than on this occasion. Indeed, only two weeks later we were warned to "hoist cold wave flag," and notified that you were having several degrees lower temperature here than you had during the previous storm, but we did not realize its increased severity, while in Florida they were scarcely disturbed, the change from nominal temperature being hardly noticeable. On consulting the charts for this second storm, we discovered that the low barometer, the disturbing cause, had originated very near the location of the preceding storm, viz., in Colorado, but, instead of the unusual route taken by the first, had followed the nominal cause, in an almost direct route toward the Gulf of St. Lawrence, and hence the high barometer and cold wave were only invited as far south as the line of the preceding low area.

Mr. Pearse. I would like to inquire if cyclones are not liable to occur in certain locations; that is in valleys and among hills, as they usually commence, I understand, on high land?

Prof. Ragan. You have reference to tornadoes. They are supposed to be engendered by countercurrents; virtually because of the effects of heat. We do not know exactly what causes them, unless they are due to this difference in the atmospheric pressure.

Mr. Pearse. My friend Sias lives in a town were they have had several tornadoes. I lived there for many years, and I studied this subject carefully. Rochester is situated in a low valley, surrounded by a number of hills. The valleys come together, and I have noticed they come down through those

valleys. They are very severe; in some instances, have driven boards through the trunks of trees.

Prof. Ragan. There is no question as to the energy of the tornado; but I am not able to give the cause. They occur in some localities more frequently than others. They occur more frequently in the South; for instance in Alabama and Georgia, and are more energetic than some experienced here.

Mr. Pearse. In some localities, I don't think we ever had any. Where I live, near lake Minnetonka, there is no record that there has ever been a tornado there.

A vote of thanks was given Prof. Ragan for his very instructive lecture.

On motion the meeting adjourned till nine o'clock Wednesday morning.

MORNING SESSION.

SECOND DAY, WEDNESDAY, JAN. 16, 1889.

The meeting was called to order at nine o'clock, by President Elliot.

MEMORIAL RESOLUTIONS.

Mr. Underwood offered the following resolutions:

WHEREAS, The Treasurer of our Society, Mr. Ditus Day, has recently been called upon to experience a deep bereavement in the death of his beloved wife; be it therefore

Resolved, That we the members of the Minnesota State Horticultural Society hereby tender our friend and coworker, the warmest sympathies of our hearts, together with the hope that looking forward to that new life into which she has been but transplanted, he may find sufficient consolation and peace.

Resolved, That our Secretary be instructed to send him a copy of these resolutions and also spread the same upon the records of our meeting.

Mr. Kenney said that Mr. Day had been for a numbers of years past a member and officer of the State Amber Cane Association, and he had had the pleasure of an intimate acquaintance with him for many years. Mr. Day and his wife had visited his family at his home in Morristown, and he had always held them in very high esteem. It was fitting that this action should be

taken for all would sympathise with Mr. Day in this time of his affliction and sorrow.

On motion of Mr. Brand the resolutions were unanimously adopted.

Mr. Brand, from committee on program, recommended that the report of the seedling committee be deferred till Thursday morning.

LETTER FROM MR. BUSHNELL.

ST. PAUL, MINN., Jan. 16, 1889.

Wyman Elliot, President Horticultural Society,

MY DEAR SIR: The Minnesota State Agricultural Society extends to the State Horticultural Society its cordial greeting, and the earnest wish that you may be very successful in your grand work the present year. I shall try and visit your meeting, if possible.

Yours truly,

WM. M. BUSHNELL,

President Minnesota State Agricultural Society.

The following paper was then read:

WILD FRUITS OF MINNESOTA.

By Col. J. H. Stevens, Minneapolis.

Mr. President, Ladies and Gentlemen of the State Horticultural Society:

The part of the exercises assigned me at this annual meeting is in relation to the early wild fruits of Minnesota.

When we consider that the tiny wild Siberian crab is the parent of the common apple, the sloe, the original parent of the improved plum, and that the many delicious fruits of the day — large and small — which are so abundant and derived from the humble parentage of their wild ancestors, of the forest and field, the mountain and valley, we must acknowledge that the world is greatly indebted for this wild product — the handiwork of dame Nature. It is highly proper then, that their merits should be briefly considered.

I will merely mention that the present products of the orchards, gardens and plantations, are the wonderful results of a proper system of hybridizing — the transmitting the pollen of the blossom from one kindred to another, the budding and grafting of one variety with another variety. The educated hand of man has accomplished all of these things, but we should always remember that the primitive wild fruits of the different parts of the globe, is the fountain head from which the luxuries of the orchards of the present day abound; nor should we forget the fact that the wild fruit of Minnesota had, and has to this day great merit. In the absence of the tame varieties, the wild to the emigration of colonial times was indispensable. In many instances the native plum was scarcely inferior to the most favored sorts; the strawberry of the prairie — small, but strongly impregnated with the peculiar pleasing flavor incident to that fruit. It was full of saccharine matter — more so perhaps, than the most favored variety of to-day. The raspberry that skirted the brush lands and also found on the margins and in the openings of the wood lands was of delicious flavor fit for the table of the gods; the blackberry of the deep green forest scarcely inferior in flavor to the Lawton; the cranberry of the marsh and the high bush of the wood land, the former abundant in central Minnesota; the blueberry of the numerous swamps in the more northerly parts of the territory with all the characteristics of the whortleberry and huckleberry of the Middle and Eastern states; the gooseberry so abundant in the big woods; the black currant which had not imparted all of its value to the Naples. There were also several varieties of wild cherries but of no especial merit. True some of our early vendors of poor whisky used to gather the common black cherries in great quantities and deposit them in their fiery liquids to improve their flavor.

Originally Minnesota had not only a variety of native fruits, but it had also a rich flora, as well as numerous plants of medical value. It could not be otherwise when a thorough knowledge of her climate and soil was understood. On the shores of her rivers, on the borders of her lakes, where the sun of summer shines for fifteen or sixteen hours a day with a heat equal to the tropics, large numbers of fruits and plants peculiar to the South abound. In her dense forests, in an early day, when the soil was a deep vegetable mould, many of the native varieties of fruits and plants peculiar to the Middle States were also found; and so in a measure to-day, but not as numerous as in

the primitive days of the territory, before the clearing off of the heavy timber; the tall oak has given way to wheat fields and clover lands, and as a matter of course the plow in constant use for more than a score of years has blotted out the native plant of the forest, and the flora of those early days existed under the same wonderful climatic influence.

In 1849 many of the different parts of the world were represented in the vegetable kingdom. The climate and soil appeared to be adapted to each variety of the beautiful flower. Botanists declared that scarcely a portion of the Union had a more numerous representation of the different order of plants. Many of these indigenous species have been cultivated for fruit and food, as well as for purposes of art and ornament. Some are grown for their medical value. Dr. J. S. Elliot, for many years one of our most skillful physicians, with a large practice, informed me while editor of the *Farmers Union*, that he was utterly surprised to find Minnesota so full of native plants so useful to mankind. Such, too, was the testimony of Dr. C. L. Anderson, so widely known as a scientist and a botanist.

But, to return to the wild fruit. Altogether we had some twenty sorts, though only two or three for commercial purposes, which consisted of the cranberry, the blueberry and the plum. The latter, while of great moment for immediate use, would not, on account of its perishable nature, bear transportation to any great distance. Our raspberries, blackberries and strawberries, together with the plum, were gathered in sufficient quantities to meet the then small demand in the local markets, but the families of the pioneer were generally suppled with an abundance — especially with the plum.

The cranberry was the most extensively exported. They were mostly gathered by the Indians, and sold to their traders. The latter shipped them down the Mississippi to their correspondents. I saw over two hundred barrels in the fall of 1849 sent down from Fort Snelling, in one shipment. Some of this fruit reached the New Orleans markets. The wild plum was in the reach of most every family. There were groves of them on the prairies where the gophers had previously broken sod; there were thickets in the bush lands; they were found in the big woods, and abounded on the margins of the sloughs and swamps; on the banks of the rivers and brooks, and in every other place where a foothold could possibly be found in the mellow soil, and here came in the part taken by nature to improve the fruit

growing on trees that were such near neighbors — apparently almost on one root. Through the agency of the wind and the honey bee, or from some other unknown source, a single tree, but undoubtedly that its ancestor, while in bloom, had been impregnated with the pollen of a better variety, would bear a large delicious plum, while its nearest neighbor, perhaps fifteen or twenty of them, would produce a pungent, bitter, sour, and as repulsive to the taste as a green persimmon; again, in other groves where the trees were so near to each other that a person could hardly pass through them, there would be found extra choice, good, fairly good, medium, worthless, repulsive, pungent, bitter and detestable specimens. The product would also vary in size. The largest plum, as a general rule, would be much tne best in flavor; the smallest the most worthless, but this was not always so, as once in a while very small specimens were found that equaled in delicious flavor those of the largest size. By a proper system of cultivation it was discovered that the size of the native plum could be increased. The fruit would mature earlier also than where it remained in its native heath.

Perhaps aside from the cranberry and the plum, the most prolific bearer of our native fruits was the blackberry of the big woods. At the proper season of the year I have seen — as many of you doubtless have — the steamer Antelope, Capt. Geo. Houghton's daily packet that traversed the two rivers between St. Paul and Carver, filled with large boxes and tubs full of this fruit. The upper, the middle, the lower decks — the cabins and every available space on the boat occupied with this fruit. It had been gathered by the early settlers and sent to the markets of the twin cities.

As I am to be followed during this session of the Society by an honored exponent, John S. Harris, with a paper in regard to the wild fruit of the Northwest, who will speak of their merits far abler than I am capable of doing, I do not deem it necessary to refer to other varieties that existed here in an early day.

Mr. Sias. Is there such a thing as a thornless gooseberry in Minnesota?

Col. Stevens. Yes, there is.

DISCUSSION ON PLUMS.

Mr. Barret. I have been a good deal interested in regard to this subject of raising plums. In the locality where I live, on the western borders of the state, where farmers are poor and struggling hard for a living, they depend almost exclusively on the wild plum as a fruit. A few are able to buy apples. But very many persons go to the shores of the river and gather large quantities of plums, can them and use them in various ways and thus manage to economize during the entire winter.

About a year ago I thought I would inspect the territory where I lived in reference to the best qualities of wild plums, and was not a little surprised at some things I discovered. I visited the shores of Lake Traverse, also passed along the banks of the Minnesota river, which flows through the coteaus not far from Brown's Valley. I was surprised at the number of excellent specimens I found at different localities; one in particular struck me very forcibly. It appeared to me that the character of the soil had much to do with the quality of the fruit.

In one locality I inspected, the water gushed out from under a shelf of rock, or bluff, and appeared to be mixed with hydrogen and soda, which was very nauseating to the smell; one would imagine it to be from a sewer. In fact the atmosphere was very much like the atmosphere of a sewer. I found there an inferior plum, which had a crisp, somewhat bitter and forbidding taste. I passed further on and came to higher ground where the soil was excellent, and there I found a variety of wild plum which was of excellent quality. I was so highly pleased with the variety that I afterwards transplanted some of them to my garden. I found they were a superior plum. I therefore conclude the soil has much to do with the quality of fruit produced. I think we may take a plum that is considered below par, put it in good soil, cultivate it and it will be greatly improved.

I transplanted from the shores of the Minnesota quite a large plum tree, perhaps three inches in diameter, and succeeded in making it grow in my garden. I was told by those familiar with the fruit that it grew as large as an ordinary peach, and that the flavor and quality of the fruit was excellent. Mrs. Buchanan, a lady very tasty in domestic matters, informs me that she peels and cans them in the same manner as she does peaches. I expect it will prove to be a very superior plum, and if so I shall be very glad to report the fact.

My nursery ground extends to the river. I have a deep alluvial soil and then beyond there is a lower plain. Growing on this lower stratum I found a tree that filled my eye; to appearance it was very symmetrical, and I thought it was valuable and I transplanted it to my nursery grounds, and this last year it bore very prolific. The fruit is of ordinary size, but very juicy and sweet, and largely destitute of that peculiar pucker of the wild plum. I think it will be classed with the first quality.

I wish others to talk upon this subject, as I want to get some information in regard to it. This is my own experience. I was much surprised in the different qualities of plums. I wish my friend had alluded to the buffalo berry. I think it was not included in the list of wild fruits of Minnesota.

Col. Stevens. The buffalo berry is not a native of Minnesota. It is found in the Upper Missouri Valley. But while it does well it is not a native here.

Mr. Barrett. I wish to say it grows on the shores of the upper Minnesota river, where I live and I have seen the trees fifteen to twenty feet high. It grows in places as a shrub owing to the character of the soil.

Col. Stevens. I traveled along the Minnesota river forty years ago from its source to the outlet and they were not there then. But I think it is possible within the past twenty years they may have been brought there. They grow very readily not only from the berry but from the root.

Mr. Kenney. Speaking about the quantity of berries that were grown in early times I would say that for a few years back I haven't seen a good crop of blackberries in this state; and I would like to inquire whether it is due to climatic influences, or what is the reason they are not bearing now as they used to do? I know thirty years ago, when I came here, I used to find very nice bushes that were loaded down with berries; while in the same places that are still uncleared we find the bushes, but they do not bear well.

President Elliot. Perhaps friend Kenney's tastes have been raised up since he has commenced with Amber cane so that the things of his youth are not the same now; his taste has changed, perhaps.

I want to call attention to one thing that was referred to as to the plum. I don't want it to go on record that you can take a poor plum and change it to a better soil and make a better plum of it; that has been tried. You can not change the quality.

The only way to change that is by hybridization and propagating a new generation.

Col. Stevens. You can improve the size by cultivation.

President Elliot. Not very much.

Col. Stevens. You can make them two weeks earlier.

Mr. Harris. Mr. Lord has some plums that he claims he has improved, making them somewhat larger and the flesh firmer.

Mr. Underwood. Mr. Taylor has had some experience with plums and I should like to hear from him.

Mr. Taylor. I am always interested when I hear the subject of wild plums discussed. We come here for the purpose of searching for the truth; that kind of truth that will be of some profit to us and that we can use, after we return, to our benefit. Perhaps I can not do better than to give you my own experience.

In 1864 or 1865 I became possessed with the idea that by making the cultivation and improving of wild plums a specialty I could do good in the community and also make it profitable. I presented my ideas to Dr. Jewell, who was an experienced horticulturist at the time, and he cordially approved of the idea that I should concentrate my efforts in that fruit line. Well, I proceeded in this way. I did not make any effort to improve varieties by hybridization, but went to searching for superior varieties. I selected and crossed more than one hundred and fifty varieties of the wild plum that I fruited. I collected varieties from every state in the United States, where they grew. But about the time that I was very enthusiastic on the subject I met a gentleman, a horticulturist from Michigan, at Lime Springs, Ia., and when he found what I was doing he told me to go home and not to waste any labor in this direction at all; that in Michigan where he lived wild plums were very abundant, but that as civilization advanced they disappeared. He said the same would be the result here.

I got many superior varieties of course and had plenty of trees to practice upon. I top-grafted a good deal. But I will say here I didn't waste much time with them and I have no faith in the wild plum. In my neighborhood there were hundreds of varieties of very superior fruit down to as bad as those Col. Stevens has depicted, which were very abundant. But the most of them have disappeared; you can't find a peck of wild plums worth anything, and yet years ago they were abundant.

I had some trees taken away by a cyclone, but the most of my trees have failed as well as the fruit. I had cultivated trees in nursery rows and sold many hundreds from them and have planted hundreds of trees and fruited some of them; but they have all disappeared. We don't try in my neighborhood to waste a bit of effort any more in this direction.

Now, that is my experience. These very best kinds that we set so much store upon and raised trees from the nursery and fruited in the orchard, after they bore a crop or two the fruit declined in quality the same as with the trees procured from the forest and become worthless. Trees also would degenerate. After spending more than twenty years at this work I have come to the conclusion that it would not be my duty to waste time on the wild plum.

Mr. Brand. Did you ever try cutting off the old trees?

Mr. Taylor. I would say I have tried the plan of cutting the trees, clear to the ground. A gentleman told me once that I should give my trees rich culture and cut them off close to the ground, and I have tried that.

Mr. Reeves. It has been our experience that the best plums are grown on young trees. In the forests they only bear well on young trees. If we want good plums we must plant trees every few years, so as to have plenty of fruit from young trees, and cut away the old trees. I think our only chance of growing plums is from native sorts. That is our experience in Iowa. In Minnesota, conditions are different, but we must remember that the plum tree as a native is a short-lived tree.

Mr. Harris. I am sorry that my friend Taylor has gone back on the wild plum, for I have a good deal of faith in it. I think there are three or four varieties that have been brought into cultivation that are giving good satisfaction. The De Soto, which originated thirty or forty miles below where I live, is a good variety. Recently there have been some wild varieties found in Houston county that resemble it very closely. The plum bears cultivation well. It can be brought into bearing when three or four years old and it has borne immense crops. Old trees in the vicinity where it was first found may still be seen. I have seen a load of plums brought to La Crosse this last season, and I know those trees still bear fine crops of fruit. Some of the trees are ten inches in diameter.

Mr. Lord found plum trees growing near his place at Minnesota City, that are seven or eight inches in diameter and that

bear a very fair crop of fruit which sells readily in the market. He has never been called upon to take less than two dollars a bushel for the fruit.

There is another plum that is cultivated in one or two places. I have exhibited specimens of it, and it is a good canning fruit. It responds well to cultivation. I know of trees that have furnished an abundance of fruit for some eighteen years past. It is the largest of all plums I know of that have been brought into cultivation. I refer to the Cheney. At our last meeting it was pronounced the best canning plum grown. I believe there are other varieties of great value. I don't expect we can take up everything and improve it.

Col. Stevens. I wish to say I have a De Soto plum tree in my garden in this city, twenty-two years old, and it bears better every year. All other varieties which I had are dead. This is one which I bought of Mr. Hall when he first introduced them here.

Mrs. Kennedy. I heard of a gentleman who drove a lot of old rusty nails into the trunks of his trees and he said it seemed to invigorate them with new life and the trees bore abundantly afterward. He had considerable experience in raising both apples and plums in this state.

Mr. Allyn. Mr. President, I would like to say a word on the wild plum question, and would hate to see it run down. We have native trees that are over thirty years old and they bear well every year. Perhaps down at Lake City they have better varieties, but as the native is a very sensitive tree perhaps it has stepped out and given civilization a chance to come in. I have raised the wild varieties very successfully. We have abundance of them and think a great deal of them; and we never failed to get two dollars a bushel for them; we found them growing on the Cannon river some thirty years ago. I would like to hear from others upon this subject. I hope we may be able to keep the plum until we find something better.

Mrs. Stager. When I first came here about nine years ago I found quite a clump of plum trees as I could tell by the blossoms. When they fruited I found that they were quite large. I tied strings upon some of the trees that bore the finest fruit and the next spring I had them taken up and set out on our grounds. They have fruited the past two years. I found one very fine plum that was as large as the Weaver which was exhibited at St. Cloud, and they have no bitter taste. I use them for canning.

I have three large trees and about fifty small ones grown from planting the pits. I have heard said that one could fruit them quicker from the seed than from setting small trees. Many trees in the vicinity of Sauk Rapids, were blighted, and out of shape, but mine were free from blight and bore very freely of those large and pleasant-tasting plums.

Mr. Harris. I want to give an invitation to those who may have fine varieties of plums to send specimens to at least four places for testing; I refer to the state experiment station, under the charge of Prof. Porter, the station at Owatonna, under the charge of Mr. Dartt, to Mr. Lord, at Minnesota City, and to Harris. At each one of those places the variety will be given a fair and impartial trial, and if it proves to be of value the one sending the trees will get the credit for the same, and this will aid in making experiments by crossings, etc.

Col. Stevens. Just a word in answer to the lady that spoke of growing plums from the seed. That will not do. It is possible you may get a better variety but the probability is that it will degenerate into a great deal worse variety. I planted seeds of plums of a very superior quality and the product was perfectly worthless. It is like it is with planting apple seeds; you can not depend upon them to produce the same fruit as that from which the seed is taken.

Mr. Dartt. We can depend on getting perhaps one tree in twenty or thirty that will be equal to the original tree, but we might not get one in fifty.

President Elliot. Say three hundred.

Mr. Dartt. Well, we will get it if we plant enough of them.

Mr. Harris. Mr. Kramer exhibited a valuable variety of plums at the state fair.

Mr. Barrett. I would inquire of Col. Stevens, suppose there was no other variety of plums near by to fertilize a certain variety, would not the product of the seeds if planted all have the same characteristics?

Col. Stevens. Most assuredly not; there is perhaps one chance in three hundred of their being the same.

Mr. Pearse. The better way is to grow the trees from young sprouts instead of propagating from seeds.

Mr. Harris. What we want is to get better varieties.

Col. Stevens. That can be done by cross-fertilization.

Mr. Pearse. Plum trees can be grown from the roots by the thousand.

Mrs. Stager. Those plums I speak of are very shy in producing runners.

Mr. Pearse. Cut the roots and I will guarantee the young shoots will come up.

President Elliot. The advice of Mr. Pearse is sound. The best way with ordinary planters is to grow the trees from sprouts of the roots. Let our experimental stations experiment with seedlings as much as they like, but let us not waste time ourselves in growing new seedlings. I think that is the province of the experimental stations, to do that class of work.

Mr. Underwood. At our place we have been experimenting with seedling plums considerably; but the location seems to be against them. We havn't met with very good success. We have planted them by the thousand, but they don't fruit well. If a person has been unsuccessful in one locality I don't think it need to discourage everyone else. That is a point I wished to bring out. I knew my friend Taylor was discouraged, was doing some bad talking, and that was the reason I wanted to bring out this discussion. While thousands of trees may be cut down and put on the brush pile in one locality, others may be more successful.

Mr. Taylor. I would not become discouraged, but I live in the very paradise of the wild plum. When the country was first settled you could gather them there by the wagon load. I don't attribute anything to location. A neighbor of mine planted a lot of seed from a superior plum, and planted in a nursery more than five hundred kinds and fruited them; he got some good fruit, and there was some quite equal to the seed planted; but the same result referred to follows with his now. In a few years they ceased to bear and they seemed to blight. Some of my finest varieties failed. There appeared a sort of oak balls on them and the trees were covered with black knot. Our wild plums, whether cultivated or not, are disappearing in the neighborhood; those of good quality are going first. Where there were thousands of acres formerly producing well, to-day the same plum grove shows the meanest and lowest kind of fruit; and if I am discouraged now I am going to state so.

I may illustrate my feelings upon this subject by relating this incident. Mr. Ingersoll, of St. Paul, some time ago sent me some money with an order for plum trees, which he had been induced to do by State Auditor Braden, who knew what fine variety of plums I used to raise in such abundance, and which

were the admiration of the whole country. But I wrote back to Mr. Ingersoll advising him not to buy them.

Mr. Sias. Mr. President, I am afraid that something will go on the record that won't look well, and I would like to inquire of Mr. Taylor if he didn't get discouraged about plums about the time I did about apples? I have understood that a tornado, or some sort of wind storm went through your place and took pretty much all the plum trees?

Mr. Taylor. I had two large trees when that tornado came that were very large, and there was room for four span of horses under the shade in the middle of the trees. The tornado took them. We get enough fruit generally from other trees for family use. My son-in-law, Mr. Morgan, is growing some nice, thrifty trees, but they don't appear to bear fruit to amount to anything.

Mr. Dartt. I would suggest that some of these fruit men have been talking in a very discouraging way in regard to fruit growing in our state. In some of our emergencies it has been thought best to send a delegate to Iowa where they hold their meetings at the same time we do ours. And it came into my mind that perhaps this Mr. Taylor might be acceptable as a delegate. (Laughter.)

Mr. Taylor. I am not discouraged as to fruit growing; understand I have faith, but I want some good reason for it and want the public to know that there will be.

Mr. Reeves. If you will send Mr. Taylor down to Iowa we will try and convert him on the plum question. (Laughter.)

Mr. Sias. Mr. Taylor will be all right as soon as he gets over the effects of that tornado.

Mr. Dartt. I wish to add that if Mr. Taylor went to Iowa I know he would be materially benefited, as well as we afterwards, for I have seen so much of the good works of the horticulturists in Iowa and so much of success following their methods that I think the more of Iowa that we get into our Society the better.

The following report was then read by the Secretary:

REPORT OF COMMITTEE ON NATIVE FRUITS.

Little can be added to the report of last year, as applicable to this part of the state.

There are no native fruits in this vicinity of great commercial importance like the cranberry. Though some attempts were

made a few years ago to cultivate them, they were not successful, and Southeastern Minnesota has very little soil adapted to them.

In Winona, Houston and Wabasha counties along the Mississippi, the dewberry flourished the last year in great profusion. The fruit was of large size and good quality, and so plenty as to interfere, locally, with the blackberry market. The bushes have been growing here since the first settlement, but very little fruit is usually seen. If it could be grown to bear every year, it would largely take the place of blackberries, being so much easier to protect in the winter, and very tenacious of life.

Wild plums are the most marketable and valuable native fruit we have here. A very small expenditure of money, time, or labor, would secure an abundance of this fine fruit to every family in the land, many now regarding it as a rare luxury. While apples will always occupy the first place in fruit work, it is believed the Horticultural Society can largely add to its usefulness by inviting increased attention to our native plums.

O. M. LORD.

The following paper was read by the Secretary:

NATIVE PLUMS.

By O. M. Lord, Minnesota City.

Native plums have not received from fruit cultivators as much attention as their merits warrant. Some of the objections will be considered, and when their good qualities are placed in contrast, they will far outweigh all the difficulties or prejudices of cultivation.

The natural habit of the tree is not symmetrical, which has made it unpopular with the nurserymen. The general character of the fruit is soft, skin tough and acrid, especially when cooked. Its softness and non-keeping qualities unfit it for general market, and its intense acidity when cooked makes it undesirable for family use. It also frequently refuses to bear when cultivated, and is sometimes affected with black knot and curculio, and the fruit is very liable to rot on the tree before maturing.

While the straggling habit of the tree makes it hard for the nurseries to handle, when they are once planted in orchard form

their habits of growth may be materially changed by careful pruning, or if they are allowed to develop naturally it will not detract from their value in the production of fruit.

In regard to the general character of the fruit, which has been indicated, it is not commonly known that a few varieties are so distinct and superior in quality as to lead to the supposition on the part of many persons that they have either been greatly improved by cultivation or that they are mixed with the European kinds. Both suppositions are errors, so far as the quality goes.

The fruit can be increased in size by thinning and pruning, and by cultivating the ground. The quality of the fruit varies somewhat with the seasons; a better quality is found in a wet or moist season than in a dry one, but it is doubtful if any kinds have been made sweeter, more palatable, or better adapted to cooking by cultivation than when found in a natural state. Therefore when good fruit is desired it is very poor policy to make an indiscriminate selection from the woods. A better way is to get from some reliable nurseryman trees that are known to bear fruit of good quality.

No mistake will be made in buying the De Soto, whether only a few were wanted for family use, or a more extensive planting for market. The fruit is of large size, fine color, and excellent to cook. The tree bears when quite young, and abundantly, and is more reliable in unfavorable seasons than most others.

The same may be said of the Cheney, though it is distinct in character. The tree has a more vigorous, upright growth, and the fruit is larger in size, and from ten days to two weeks earlier in ripening. The appearance of the blossom would indicate something of the European origin in it, but it is without doubt a true native, as the skin and pulp correspond so nearly to the general character of all the wild plums.

Among other kinds that can be relied upon when cultivated is the Weaver, a free stone, with firm pulp, fair quality, and good for cooking. The Forest Garden has also given satisfaction in some localities. The Rollingstone has not been so generally tested, but as it originated here it will probably be as well adapted to different soils as any of those mentioned. The tree shows the marked character of the true native, though specialists have pronounced it as differing so much from any known variety that it is easily identified. The fruit, more than any other wild plum, resembles the Green Gage family. As a dessert

fruit it is superior to those above mentioned; it also keeps longer after ripening, and being much firmer is a better market variety. In season a week or more earlier than De Soto or Weaver.

These kinds have been grown in Minnesota so successfully that no doubt is entertained of their entire hardiness and reliability in all parts of the state. Northern Iowa has also produced some excellent varieties that are recommended with great confidence for our state. Among these are the Spear, the Rockford, the Wolf and some others.

As to the subject of non-bearing, it may be well to suggest that the best practical remedy is, in planting, to mix different kinds, and to plant closely together, from four to six feet one way and twelve the other. The claim is also made that this system of planting effectually defeats the ravages of curculio. The rot can be obviated only by carefully thinning the fruit; but it is believed that the varieties above named are peculiarly free from it.

PROPAGATING FROM SEED AND GRAFTS.

As plum trees are rarely sold at the nurseries at less than half a dollar, the price has been an obstacle to large planting. A few hints in regard to propagating, where natural thickets are not available, may be useful to some who have no experience. The seed, to be reliable, should be placed in moist sand and slightly covered as soon as possible after the fruit is ripened, where it will be exposed to freezing, and then planted as soon as the ground is open in the spring. If seed is planted from natural trees that are entirely isolated, the fruit will bear a strong resemblance to the parent. But if other varieties are near the parent when blossoming the character of the fruit can not be predicted. From the success in some experiments in hand fertilizing we are led to hope that all the best qualities now known can be combined to produce plums not inferior to the best Europeans.

As with grapes and strawberries, plums and other fruit, the natural or chance process of cross fertilization is not known to produce a superior variety once in ten thousand times. Seedlings may be successfully top grafted, but the trees will not be so long lived nor any more productive than sprouts transplanted from bearing trees. The grafts, however, will be more vigorous in growth and more symmetrical in form. Sprouts will

always produce fruit true to kind, while grafts are sometimes modified.

Much has been said to prove the theory that proper fertilization is the main thing necessary to produce abundant fruit, and the claim has been made that some kinds are better adapted to fertilize than others from the larger amount of pollen they produce or from their inherent prepotency. A careful examination of the blossoms at the proper time will show very little difference in the amount of pollen in any of the varieties.

As to prepotency, there is a wide field for observation and experiment before definite conclusions can be made. The De Soto, Rollingstone, Weaver and some others will fertilize themselves, whether planted singly or in groups, and the blossoms of these will show that the style-bearing stigmas are much shorter than the pollen bearing anthers, the petals being cup-shaped and corrugated, while of other kinds the stigmas protrude one-third their length, or more, beyond the pollen. The petals being larger and entirely flat or smooth, it is possible that the form of the blossom, giving it the power to withstand more severe cold, is what enables these trees to mature fruit when others can not do so. For these reasons, and many others that might be given, much more stress is placed upon planting these varieties than upon the particular soil or manner of cultivation.

The following paper was read by Mr. Harris:

NATIVE FRUITS IN MINNESOTA.

By J. S. Harris, La Crescent.

How many of the edible fruits now growing wild in Minnesota and other portions of the Northwest have grown there from time immemorial, I have no means of knowing. The first white men who settled in this region found the American crab apple (*Pyrus coronaria*), Canada plum (*Prunus Canadensis*), red and black raspberries, high bush blackberry and trailing or dewberry, strawberries, grapes, currants, gooseberry, June or service berry, cranberry, and some others flourishing in a great variety of locations. The first settler not only found them here, but he found some of them of a better quality than the same species were

when growing wild in the old states. Especially is this the case with the native plum, the strawberry and blackcap raspberry. While so far as has come under my observation our native blackberries are inferior to the natives of states further east and south.

I think I am able to speak advisably on the comparative quality of these fruits, as my residence in this Northwest covers a period of thirty-eight years, and my acquaintance with the native fruits of the East and South was in my boyhood days when the appetite was keen and the taste uncultivated.

There are doubtless varieties among these wild fruits which, with skillful cultivation and scientific propagation, will develop peculiar merits that shall yet cause them to occupy prominent places in the pomology of North America. Among them there is no one class so inviting for the experimentalist as our wild plums. They are quite universally distributed, and the trees are found growing in clumps and groves in our lowest valleys, on our highest hills, and in every locality wherever the annual prairie fires have not destroyed everything of the tree kind. They are always perfectly hardy and generally fruitful.

While botanists claim that there is but one species of them, they appear at some period to have broken into a number of quite distinct varieties, producing fruit of similar characteristics, yet differing widely in size, color, quality and seasons of ripening. The colors are almost white, yellow, orange, salmon, pink, deep red and purple. They also exhibit a wide difference in foliage, the leaves of some being long, others nearly round, pinate, serate, double serate, and nearly smooth. The varieties also differ in size and habits of growth of the trees; some are of straight trim growth fifteen to twenty feet high, others with large branching heads, and others mere scraggy shrubs, but all are more or less thorny. The size of the fruit varies from one-half inch to one and one-fourth inch and over in diameter, and from round to oblong in shape. In their wild state nearly all have a pleasant tasting pulp, but the larger portion of them have a thick, acrid skin, which in cooking has a tendency to dry up and toughen. They also have an acrid taste about the seed that often imparts an unpleasant flavor to the sauce. There are, however, here and there found a choice variety apparently several removes from the average. A few varieties are found with skin thin and tasteless, that disappears in cooking, and with a more meaty flesh and a comparative freedom from acridity about the pit. In some of them the flesh parts readily and clean from the stone.

Through a process of grouping together such varieties as possess the most desirable points, giving good cultivation, or using tame stocks to graft upon, and planting the seeds from fruits so produced, I believe they will soon break from the original type and give us new forms, and after the first positive variation is secured the field of operation for improvement will be limited only by the intelligence and preservance used in its occupation. With the cultivation of seedlings from selections of the best, we hope to secure firmness of flesh and shipping qualities that will place them beside prunes and apricots, and that they may even lead these as a fruit of commerce. I also believe that by hybridizing with some varieties of the domestic plum, we would quickly secure a valuable fruit.

Those who seek to bring about improvements should work towards certain points, and never lose sight of them in their manipulations and crossings. The most desirable points are to increase the size of fruit and solidity of flesh; lengthen the keeping qualities; eradicate acridity or unpleasant after-tastes and retain high and distinct colors. A few varieties have already gained more than a local reputation for their good qualities and are proving worthy of a general cultivation. Of such are the De Soto, Weaver, Forest Garden, Rollingstone, and, best of all, the Cheney; but I believe there are some yet to be found in their native haunts that may surpass even the best of these. They can not be looked after too soon. In the older parts of this state the clearing up of thickets and the pasturage of fields has proved so destructive that some of the best varieties of thirty years ago are extinct.

A report from the Committee on Evergreens being called for, Mr. Brand read the following paper:

EVERGREENS.

By O. F. Brand, Faribault.

Next to the growing of fruit, and among farmers we might say, as a requisite of, and inseparably connected with fruit growing, is the growing of evergreens. A lengthy article might be written about the value of evergreens and especially of pines as regards the amelioration of climate, by rendering the atmosphere more healthful and the earth's surface more suitable for the home

of man. But in this busy age few would stop to read a lengthy article, and the utility of evergreens for health, ornament and protection, none will dispute. The most important question in connection with the subject is how to induce people to plant and care for them. One trouble is the almost universal desire to get hold of the almighty dollar sometime between the first of April and December of each year.

In growing evergreens the money value does not begin to be realized quick enough to satisfy the great multitude who from choice or otherwise are obliged to occupy and till the soil, as it is not possible to obtain much protection until six or eight years after planting, where small trees are used, and large trees are not possible to the most of the few whom a kind providence has blessed with a disposition to become public benefactors in this direction. Life is short. The ownership of land is surrounded with so many uncertainties which, together with the quick-coming-dollar objection occasions the planting of evergreens to be left to the very few — whose æsthetic taste for the beautiful as well as the useful in nature exceed their avarice.

How can we get the trees planted and cared for? We are satisfied that for the reasons mentioned individual effort will never accomplish much in this field. The severity of our winters and increasing dryness of our summers admonish us that some systematic move for the growing of evergreens should be undertaken by our state and general government without delay.

A recent investigation which I have made in our "Big Woods" region of our state leads me to the conclusion that there is not more than fifteen per cent of our original deciduous timber now standing in that region; and to a great extent the best timber has been culled from that which remains. Through all that once beautiful forest there is scarcely more than enough left for a fair farm supply.

There is one part of this subject that appeals directly to the individual, and that is the increased value that is given to farm lands by a liberal use of evergreens in the decoration of the grounds around the home and in forming shelter belts for the protection of stock, buildings, garden, and orchard. For this purpose there is nothing so valuable as evergreens. They should be planted mostly to the northwest and south of the residence. A belt all around a yard for cattle should be found on every farm. They increase the temperature of the surrounding atmosphere. Their millions of pointed needles check and repell the bleak

north or west winds, and the difference between standing on the windward or leeward side of an evergreen belt in a cold wind is as great as between January and June. To shut out all the wind the width of the belt necessary will depend on the variety used.

A single row of White Spruce will stop more wind than a single row of any other variety. A slow grower until two feet high after which it makes an annual growth of not less than two feet. Its habit of forming a dense growth below, together with its ability to grow on any soil, wet or dry, and flourish in dry seasons as well as wet, make it the most desirable of all for a single row.

For a large belt of evergreens the common White Pine is undoubtedly the most valuable of all. If a few rows only are desired for a quick growing shelter belt the Scotch Pine is the best.

In the southeast part of the state on clay subsoil the Norway Spruce may be used. They make a more rapid growth than the White Spruce but are not so reliable over a large portion of the state.

Three rows of White Spruce set five feet apart in the row, with ten feet between the rows will make the best possible windbreak for the amount of ground occupied. The White Cedar is also valuable for a windbreak and a timber of great value both for posts, ties and telegraph poles. It grows reasonably fast on good soil and should find a place around every farm home, utilized for a hedge, windbreak, screen or as single specimens.

The Balsam Fir makes one of the finest ornamental trees. Its tall, graceful form and dark green foliage renders it one of the most conspicuous. On heavy soil it makes a good windbreak for from fifteen to twenty years, and still longer as a shelter from high winds, but as it grows tall and begins to get old the lower limbs die.

A grove of White Pine, or Scotch Pine, set four feet apart in the row, with the rows eight feet apart, will need to be trimmed to eight feet apart each way in the course of ten years. At that time the Scotch Pine will make the most fuel. It makes very good summer wood and a round chunk of it eight or nine inches in diameter put in a heating stove at night will show more live coals in the morning than a chunk of maple of the same size. After the thinning out the White Pine will grow the fastest, making an annual girdle of wood of about three-fourths of an inch in thickness, and will gain from two to three feet in height

each year. It is safe to say that in the next 25 years they would gain 65 feet in height and stand at that time not less than 80 feet high. At that time an acre containing 680 trees would be worth $5 for each tree, or the snug little fortune of $3,400.

Thirty years from now there will be left but little of our native pine, and it is reasonable to conclude that lumber will then be worth not less than $25 per thousand feet. A tree 40 years old will give at least 300 feet of first-class lumber, which would require two logs, one 16 feet long and 18 inches across at the small end, and one 14 feet long with a diameter of 15 inches at the small end.

The success of evergreens depends on the care they receive. There is nothing that can be killed any easier; with reasonable care they are about as certain to grow and do well as any other tree.

For ornamental purposes set trees from two to four feet high. As they are usually set in grass land, remove the sod from a hole six feet across, take out the soil from a hole a little wider than the roots of the intended tree will fill when in their proper shape. See that there is a sufficient quantity of fine rich soil to fill the hole. Place the tree in so it will stand about two inches deeper after it is settled than it stood in the nursery. Straighten the roots in proper shape and after the hole is two-thirds full of earth pour in three or four pails of water — enough so the soil in the hole will be thoroughly saturated. A fork gently used will aid in letting the water settle all through the soil. Fill the hole with earth and pour on more water, which will settle the earth around every fibre of the roots. After that has settled away a little, dry soil may be put on top, which should not be wet or stamped or it will bake and dry out, and crack open in a dry time. Cultivation once in ten days should follow, that is, a stirring of the soil to a depth of four or five inches, a foot distant from the tree, and about two or three inches deep close up to the tree; nothing should grow within three feet of the tree. If it is not desirable to cultivate, the ground should be covered with mulch from four to six inches deep and left till the next spring, when the soil should be stirred and the mulch replaced. Continue in this way for four years and other things being right the long life of the tree is assured.

In planting for windbreaks or for timber and shelter belts, trees under two feet and over one foot, will be found to be best if the cost is within the means of the person planting. If cheap

trees or none must be had, trees grown in the sun one or two years will do. Generally such trees as can be bought for ten dollars per thousand. See that the trees are bought from a person who can show that he has been eminently successful in handling evergreens, for a little carelessness, a little exposure of the roots to the air, and the ability to grow is gone. It is of first importance to keep the roots moist all the time from the time the spade first touches the roots till they are safely in the ground. The least exposure of the roots to the sun or wind will dry them; keep them damp or wet. Prepare the soil as for a garden, except that it needs no manure. Lay off the rows four feet apart one way by eight the other, planting a row of corn between the rows one way for two or three years. Now, with the roots of the trees wet and covered up and a few in a large pail with the roots in water, proceed to plant one at a time. Plant them a little deeper than they grew in the nursery, spreading the roots out in all directions and covering with fine mellow soil, being careful that no straw, stubble, lumps or other rubbish gets in around the roots, for all such things dry out quickly and do not hold the moisture like earth. They also keep the soil from coming in close contact with the roots. If the soil is at all dry use a little water to each tree but put none onto the ground after the tree is planted. The place for water when planting trees is in the ground on the roots and not on top. Press the soil firmly around the roots and put loose soil on top; within a week or ten days cultivate thoroughly, stirring the surface of the ground and killing all the weeds. Continue the cultivation until the first of July; then it would be well to pull a little earth toward each tree, hilling up a couple of inches. At this time if mulching is put around each tree four inches deep and out two feet each way it will need no more care till the next year, when good cultivation should be given again and continued each year till the tops of the trees shade the ground. Stock must be kept away from evergreens or they will break them down or destroy the lower limbs.

There can be no labor put upon the soil that will make so grand a showing in ten years as that devoted to the care of evergreens—and there can be no monument to one's memory and good deeds erected on the soil by the person whose name it is desired to perpetuate than a fine grove of well grown evergreens.

THEIR VALUE AMONG APPLE TREES.

The influence of evergreens upon fruit trees has been found to be very beneficial. In numerous instances I have used them to protect apple trees from the sunscald in winter. Of three rows of Tetofsky apple trees, one row of which was planted with an evergreen near to each tree on the south and the other two rows without such protection, the row protected is in fair condition, while but few trees remain in the other two rows. Another block of Duchess of four rows—having a windbreak of one row of pines, fir and spruce along the west end of the rows—bears the most fruit on that part of the block which stands nearest to the evergreens and very much less as the distance from the evergreens increases. The evergreens were set about two years after the apple trees but are now fifteen to twenty feet high. The rows of apple trees run east and west and the slope is a little to the southwest.

On the eighth of January, 1886, I was at Orlando, Fla. The day being very warm I concluded to start north to Jacksonville. Going to the depot and looking on the bulletin board of signal service I read as follows: "Cold wave approaching. Look out for killing frost as far south as Tampa. (Signed) HAZEN." With a temperature at that time of 84° in the shade the general conclusion was that Hazen was a little "off" his base. I went to Jacksonville and on the eleventh or twelfth saw ice four inches thick—with a temperature of 17° above. Later on going back to the south part of the state I passed through the largest orange grove in Florida and found that in that grove when the native live oak had been left and the orange trees were interspersed among them there was comparatively little loss or damage done by the freeze, but wherever the groves were not well protected the fruit was an entire loss and in numerous instances the trees were killed.

The destruction of the pine in all the gulf states to the north and west of Florida for the past twenty years, undoubtedly opened the way for that cold wave to reach as far south as it did. My opinion is that if the western part of our state and all of Dakota was crossed with continuous unbroken rows of evergreens running east and west, two or three rows together, and these belts one or two miles apart, that the course of the cold wave and blizzard would be broken up and the damage which they

occasion be greatly lessened. In fact the genuine blizzard would scarcely exist at all for it would be impossible for it to be created as the conditions favorable for origin would not exist.

DISCUSSION.

Mr. Pearse said he had good success transplanting trees without the use of water. He never used any water in setting evergreens. He transplanted 4,000 trees three years old without any loss. Evergreens were cheap and could be had for seven dollars a thousand and were the cheapest trees to buy. These trees in a short time would be valuable and if generally planted by the farmers of Minnesota it would have a marked effect upon the climate. They should be set by the millions. No subject is worthy of being advocated by the society more than the planting of evergreens. He advised setting White Pine, Scotch Pine, Balsam of Fir and the Norway Spruce.

Mr. Urie said he had set a good many evergreens and agreed with Mr. Pearse as to the importance of planting them generally. He would advocate setting Scotch Pine; it was a beautiful tree, a rapid grower and a hardy tree. He had trees that were forty-five feet high that had been set some twenty years, and some of them were ten inches in diameter. Farmers would do well to plant them in rows around their farms, and across the farm; there was no danger of planting too many.

Mr. Brand thought it best to use water in setting, as it was always best to be on the safe side. In case of drought the water would give the trees a start.

Mr. Pearse. One thing I wish to explain. I always mulch large evergreens and find it better for the earth to absorb the moisture from the mulching than from water poured on at time of setting. I am no advocate of pouring water in a hole to pack the dirt, when with mulching I can get a better result.

Mr. Brand. I contend that we need water to settle the earth around the roots of the tree. They will settle in a better condition than to put in the soil and secure it with the foot. Water settles around every fibre.

Mr. Harris. I do not think water is beneficial if the ground is in the right condition for planting; it is better without water than with it. But give the mulching immediately after the trees are planted; also select an hour of the day when the wilting process is not going on freely. There are more evergreens killed by exposure than by the want of water.

Mr. Underwood. The whole secret in setting evergreens is in "firming" the roots. Whether water is applied or not the ground must be firm around the roots. Then the rootlets will start out and have something to work in; and if set firm, that is the whole secret of success. I puddle the roots well and set them firm. As a nurseryman planting more or less trees I have never had any trouble in following these rules.

Mr. Sias, from the committee on Russian Apples, presented the following:

REPORT ON RUSSIAN APPLES.

By A. W. Sias, Rochester.

Mr. President, Ladies and Gentlemen:

We have been crowding the Russian apple too far south. Make its southern limit, latitude 42° and the northern 60°, and we will have as the centre of the Russian apple belt, latitude 51°. The southern limit would be on the northern line of the State of Pennsylvania, running west near Chicago and Cedar Rapids, Iowa. The centre would be a little south of Veronesh, Koursks, and Warsaw, Russia; Winchester, England; passing through lakes Winnipeg and Manitoba in the British possessions. Confine the Russian apple to this belt, and you can maintain its good reputation much better.

The most convincing opponents of the Russian apple are to be found south of this parallel. Minnesota planters will find room for about a dozen varieties from the hardiest and best of the Russians, for some time yet, while the seedling growers are "proving up" on their rich claims. Had you taken all of the Russians from the tables at the state fair last fall, the exhibit would have been meagre indeed.

At Nora Springs, Ia., last month, there was a call from the convention for a committee of six to make out a list of about twelve varieties of the most popular Russians. Prof. J. L. Budd was made chairman of the committee, while the balance was composed of some of the best posted men in the state. Your humble servant had the honor of a place on the committee also. We had no trouble in making up a list of twelve that we were all agreed on as being as hardy, or more so, than the Duchess. Prof.

Budd says he has a hundred varieties that are more hardy than the Duchess. Aside from the Hybrids and Wealthy, there were but very few apples in our district this past season outside of the Russian list.

I will close this paper by submitting a list of what I consider the twelve best varieties, after getting all the information possible on the subject, viz.: Autumn Streaked, Gen. Greig, White Russet, Lieby, Golden White, Hibernal, Garden Apple, Antonovka, Plikanoff Small, Titovka, Red Anis, Yellow Anis.

The following report was also made:

REPORT ON RUSSIAN APPLES.

By Andrew Peterson, Waconia.

S. D. Hillman, Secretary, etc.,

DEAR SIR: I have received your letter and the premium list and program of the annual meeting of the Society. As I can't come to the annual meeting, I will give a short report on fruit of my orchard this year.

The apple crop was heavier this year than it ever was before. The oldest tree of the Lieby bore two barrels of apples. Some trees eight years old of the Lieby also bore a heavy crop. Charlamoff and Christmas apples bore well, also Plikanoff; and six varieties that I received from Prof. Budd, five year-old trees, had some fruit, but am sorry to say that the blight was worse than any year before.

I think if I had had my trees mulched they would not have been affected so bad; this fall I mulched all my trees with second crop dew grass. In such a long, dry season as we are sure to have I expect it will hurt the trees in orchards somewhat.

Of grapes, Concord, Delaware, Isabella, Eumelian, Lindley and Hartford Prolific, all these varieties bore a heavy crop.

Also raspberries and strawberries bore a good crop.

Mr. O. F. Brand is mistaken concerning the hardiness in trees of the Duchess and Lieby at my orchard. Duchess will never equal the Lieby in hardiness. My oldest Duchess and Lieby trees are of the same age, about fifteen years old. The Duchess trees are more than half dead and some of those remaining are nearly

dead, but the Lieby is yet sound, except it blighted more than the Duchess this summer. If the Lieby gets sunscalded, which is very seldom the case, I notice that it heals over pretty quick, or within two or three years, but the Duchess never heals. So I would rather plant Lieby than Duchess. As an eating apple the Duchess apple is more of value but its season is too short for keeping. Lieby is very good for cooking and we use them in our family as well as eat them from the hand. It will keep until February.

Last year when Mr. Brand was over to my place the Lieby apples were cracked and did not look very nice, but they seldom do so.

The Christmas apple seems to me just as hardy as Duchess. It had a heavy crop this year with very nice fruit; and I have some of them yet which are just as fresh as when I picked them; so I think they will keep until February. The tree was entirely free from blight.

Number 4 M., Ostrokoffs Glass, top killed some in the severe winter of 1886, but I had a Duchess tree of the same age, that was top killed just as much; so I think we will have to get along here in Minnesota with Lieby, Duchess, Christmas and No. 4 M. until we get hardier seedlings.

The Red Cheeked, as I have said before, is the hardiest tree we have got in Minnesota. But it does not bear much fruit; perhaps it will bear better when it gets older.

DISCUSSION.

Mr. Reeves. Mr. President, as a member of the Northern Horticultural Society of Iowa, I would say that the Russian varieties that were recommended by that society at their last annual meeting, were not recommended for general planting but for trial. We may change this list at our next meeting and drop out some of the twelve varieties mentioned.

Mr. Brand. I would ask Mr. Reeves how many of those varieties are in bearing, how long they have been bearing and how many apples any particular tree has borne in a single year?

Mr. Reeves. There are one or two varieties that are very fine; Gen. Greig produces fruit resembling Fameuse, about the same season and quality; it seems to show less blight than any other kind among the Russians.

Mr. Brand. How long has it been in bearing and how much fruit has it borne in a single year?

Mr. Reeves. It has been in bearing four or five years. It has only gone far enough to recommend it for trial. We wish to emphasize that they are still on trial and not to be recommended for general trial.

Mr. Brand. How far south of this is that where you have seen them grow?

Mr. Reeves. Forty to sixty miles south of the state line of this state. It is north of the line that is understood to be the south line of the region that is adapted to growing Russian fruits.

Mr. Philips. Mr. Chairman, one word in regard to that list of Russian varieties. I have been on a committee in our state for the past three years that have been looking up the Russians. I would say that I have come to the conclusion, as well as some others, that the Golden White and the White Russet are the same thing.

Mr. Brand. While many of these Russian varieties show very good colored wood I have a sample of Russian wood here that is comparatively perfect. This is taken from a lot of root-grafts set in 1874; the trees have never been transplanted. The tree is perfect to all appearance and looks better than Whitney in the same row. But this tree has never produced half a bushel of apples. I don't know its name, but it is a Russian and does not blight. I had sixty-five varieties. They are mostly gone now. I have here a sample of wood from Duchess, standing in another row some forty feet distant from the first specimen. Its wood is badly discolored, but it has borne many bushels of fruit and bids fair to produce many bushels more.

I wish to make this point that while many Russians show good wood and look all right they are good for nothing to bear apples.

Mr. Sias. Perhaps I ought to state in deference to Prof. Budd that this list of apples that I have made out has no referrence to the list presented at the meeting at Nora Springs, at which meeting I was present. This is a list made out from my own standpoint, independent of that, although there are several varieties named that can be found on his list.

Mr. Moody. I visited the Russian orchard of Mr. Moulton last September. There was some one hundred and twenty Russian varieties at one time in bearing, but there are only about a dozen varieties left now. I was greatly surprised when I examined those trees. They had been top-worked on Transcendent. This orchard is some two miles north of this city. The orchard seems to have been rather overlooked by this Society.

Col. Stevens. The boot is on the other foot; the orchard has not been overlooked by the Society, but the owner has overlooked the Society.

Mr. Moody. I am speaking of the results since it has been a nursery.

Secretary Hillman. It is found by experience that the practice of top-working Russians on the Transcendent is usually a failure.

Mrs. Campbell. Mr. President, I notice the gentleman in speaking of Russians speaks of the Duchess; do you not consider it a Russian?

President Elliot. We do.

Mr. Brand. Mr. President, not by all the authorities; Col. D. A. Robertson is the only man that I know of who is willing to admit that he has carefully traced its origin, and he says the Duchess originated in Sweden.

Col. Stevens. Does not Prof. Budd say that he saw it in Russia?

Mr. Brand. Prof. Budd stated that when he was at Kazan, in writing from there, that he had doubts about Duchess being a true Russian, he says that he saw varieties that resembled it very much. When he got on the Volga at Zimbursk he writes: "I do not find the true Duchess here."

Mr. Sias. I understand Prof. Budd claims now the Duchess to be of Russian origin. I saw something to that effect in a late report.

Mr. Reeves. Prof. Budd only assumed, in the article referred to, Duchess to be Russian, but admits he could not find the proof of it. He states that he found an apple at one time in Russia that he and Mr. Gibb both pronounced to be Duchess, but on tasting it found it to be a sweet apple, which was the closest he came to finding the Duchess in Russia.

The following paper was then read by Mr. Harris:

RUSSIAN APPLES.

By J. S. Harris, La Crescent.

I am frequently asked the question what do you think of the New Russian apples?

The species of apples successfully cultivated in the older settled

portions of the United States are native born descendants of European varieties brought over in the early days of its settlement, and without doubt in my mind some difficulty attended the early efforts to adapt them to culture in our own climate and soil. With the single exception of Duchess of Oldenburg there is not, I think, a variety of European origin in general cultivation over any broad area of the country. What has become of the apples of our grandfathers? They have all given place to the young seedling generations to the manor born. They were from England, France and Germany, and were very suitable progenitors of a race adapted to our Eastern and Middle States, but now civilization has advanced beyond the borders, and the great Northwest is filling with a people who have even a keener relish and better taste for fruit than had their fathers. The Northwest has clearer skies, brighter suns and drier atmosphere than those lands our fathers first trod.

Russian apples were long since adapted to conditions similar to ours. I expect that we will meet with difficulties in transferring them across an ocean and a continent. They will likely be homesick and shorten their lives in pining for the land of their birth; but will not their seedling posterity inherit their native hardihood and vigor and an affinity for their new home and its surroundings? I do not expect that they will survive forever or many of them prove worth naturalizing, but there will be a survival of the fittest until some bright, vigorous seedling descendant of each type roots them out and usurps their place. I do not suppose that thirty years hence a half score of them will be allowed a place in the Northwestern nurseryman's catalogue, but I predict that just as certain as that the descendants of the fruits of West Europe have become adapted to the more favored portions of our country, just so certain will the descendants of the fruits of the Steppes and valleys of Russia find a congenial home in Minnesota and upon the prairies of the Northwest. And now you have in a nutshell what I think of the Russian apples.

It is to be hoped the Russians will be tested as soon as possible in all localities in the cold north, and thoroughly purged of all that are worthless. I can not close without urging all cultivators to raise seedlings from the best, and those who can to cross the hardiest and best Russians with the most juicy and best of other classes, and to raise seedlings.

Mr. Wilcox gave notice of a proposed amendment of the constitution with regard to fees of members of local societies.

Prof. Porter suggested that a committee be appointed upon amendments of the constitution, and the president appointed as such committee Messrs. Wilcox, Dartt and Underwood.

The following report was presented by Mr. Harris:

HORTICULTURE AT THE STATE FAIR.

By J. S. Harris, La Crescent.

The display of fruit at the state fair (held Sept. 10-15, 1888) was one of the largest ever made in the state and in some departments the finest and most instructive, comprising over a thousand plates.

One of the chief centres of attraction of the fruit exhibit was found in the display of New Russians, comprising about eighty varieties, and filling one hundred plates, by A. G. Tuttle of Baraboo, Wis. The larger portion of these were of larger size and of more pleasing appearance than are usually found in an equally large collection of American varieties grown and exhibited by any one individual. The flavor and quality of such as were in season compared favorably with such American varieties as were in season.

Next to Mr. Tuttle in the display of Russians came Wm. Somerville, of Viola, Minn. His display included fifteen to twenty Russian varieties besides Duchess and Tetofsky, Wealthy, and some of the Rollins seedlings, and about eighteen varieties of Siberians and hybrids. Many of his Russians were of remarkably fine appearance. He has had a long experience in fruit culture in this state and is noted as a careful cultivator and close observer. He has expressed the opinion that some of the newer Russians will prove as hardy and well adapted to growing in this state as has the Duchess.

C. H. Greenman, of Chatfield, had the next largest exhibit of Russians, comprising twelve to fifteen varieties, three or four of them very good. His was followed very closely by Andrew Peterson's of Waconia, who is one of the most intelligent experimentalists in Minnesota and one of the first to fruit varieties of the earlier importations. Sidney Corp, of Wabasha county, also showed several varieties of Russians in connection with others.

E. H. S. Dartt, of Owatonna, had a large and select exhibit of the varieties most commonly grown in this state, including a few Russians. J. S. Harris, Charles Hawkins, Ditus Day, M. Pearse, J. T. Grimes, and several others made good exhibits.

The largest exhibit of Minnesota grown apples, exclusive of Siberians, was made by J. S. Harris, and second largest, by Wm. Somerville.

Duchess and Wealthy apples were prominent in nearly every exhibit, showing conclusively that they are more widely grown than any other varieties and most certain of producing crops. The largest specimens were in Mr. Dartt's collection; the finest in Mr. Kramer's and Klein's, of Houston county.

H. J. Ludlow was on hand with a large display of his new seedling, the Okabena, which was originated in Nobles county, and is one of the most beautiful and best flavored seedling apples ever produced in this state. The Jewell Nursery Company took the display in charge and showed some of the trees in connection with it. Other Minnesota seedlings were shown by Mr. Kramer, Klein, Richardson, Ostman and two or three others, but nothing new besides the Okabena and Klein's that gave promise of great value on account of superior quality.

The Jewell Nursery Company had charge of a display of seedlings that were originated and grown by J. S. B. Thompson, Grundy Centre, Iowa, comprising about seventy-five varieties that, for size, beauty of appearance and quality, surpassed, in our opinion, any like number of seedlings ever produced in the annals of American horticulture. It was the fruit of theory reduced to practice, and it does seem that if the same skill and perseverance were given to growing seedlings of the varieties of the far North, we should soon have upon our catalogues an ample list adapted to growing in Minnesota. We trust that it was an object lesson that will encourage thousands of our people to plant seeds of our best fruit with the sanguine expectation that some of them will produce trees and fruit adapted to this clime.

It is a matter of regret that we did not have with it the large and instructive display that could have been made by Peter M. Gideon as a finishing feature of the apple exhibit. Mr. Tuttle had an excellent exhibition of cranberries, showing their improvement under cultivation.

The exhibit of native plums was quite extensive, but nothing new was brought out that promised to be of any greater merit than the De Soto, and some other varieties heretofore exhibited. The season was not considered favorable for this fruit.

The display of grapes was as large and included as many varieties as have ever been shown in the state. The size of bunch and berry, and the compactness of the clusters have never been excelled. But unfortunately from several causes the season had proved unfavorable for their early maturity and generally they imperfectly colored up, unripe and sour. Only a few Moore's Early, Lady, Worden and Delawares were in an eatable condition. Perhaps it would have been better if no exhibit of this fruit had been made. The leading exhibitors were A. W. Latham, Excelsior; R. Knapheide, St. Paul; N. J. Stubbs, Long Lake; M. Pearse, Norwood; and G. R. Robinson, Minneapolis.

The display of strawberries, raspberries and currants in bottles by Wm. Lyons, C. L. Smith and others, was a pleasing and instructive feature of the fair. J. C. Kramer, of La Crescent, showed immense specimens and clusters of his new seedling, the Princess, a variety if not misrepresented destined to create a sensation if it does not revolutionize the business of growing this popular berry and place it within the reach of all classes.

In the floral department the competitors were not as many as at some preceding fairs, but the variety, quality and beauty of the plants as they were arrayed in profuse bloom, and with their fragrance greeted thousands who passed to take in their beauty, could not well be excelled in any land. The principal professional exhibitors were R. J. Mendenhall, Minneapolis; L. L. May & Co., St. Paul, and J. Vasatka, Minneapolis, in the professional department; and Miss Julia Lyons, amateur. Miss Lyons is a daughter of Wm. Lyons, a prominent small fruit grower and member of our Society. The plants and flowers were propagated and grown in a most skillful manner by herself as a recreation, showing knowledge and a refined taste. They reflect honor to the grower and were an object lesson of what may be accomplished by a busy woman when prompted by a love of the beautiful. The growing of flowers for market is as easy, pleasant and lucrative as almost any of the employments pursued by women who have to earn their own support. Why do not more of them engage in it?

Mr. Harris, from the committee on Fruit Blossoms, presented the following:

REPORT ON FRUIT BLOSSOMS.

By J. S. Harris, La Crescent.

Mr. President and Members of State Horticultural Society:

I have no doubt but that valuable results may follow from the careful record of the dates of fruit blossoms and the conditions of the weather, temperature, direction of winds, etc., for a term of years — and if the managers of the experimental stations designated by and under the direction of this Society were receiving any remuneration whatever I would recommend that it be made one of the duties of such managers to keep a careful record of the dates of the blooming of the various fruit trees and plants in their various localities and note the causes that tended to full crops, to partial or total failures. To facilitate this work and insure accuracy it might be expedient to furnish the reporters with blanks and printed forms.

I have during the season borne in mind that I was a member of this committee, and have made some notes and records which I respectfully submit to you, commencing with April 15th. This day for the first time I observe a few fully expanded blossoms upon wild strawberry plants. No frost this morning.

May 19th. The color is showing on the blossom buds of the June or Shadberry.

May 21st. Blossoms have opened out on the Juneberry; color is showing on the buds of Morella cherry and Cheney plum. Weather warm and rather pleasant.

May 22d. This morning blossoms on Morella cherry and Cheney plum commence to open and at evening they are in full bloom. The Rollingston, Le Duc's Favorite and some other varieties are beginning to show some color. The day has been clear and very warm for the season.

May 23d. The Rollingstone, Le Duc and other native plums are beginning to expand their flowers and the Cheney are a perfect bank of bloom. The flowers of this variety are larger and differ from any other variety that has come to my notice; the stamens are apparently well supplied with pollen. Weather warm and showery.

May 24th. De Soto plums are opening their bloom a little this afternoon; an occasional blossom is beginning to open upon the Transcendent, Gen. Grant and a few others of the Siberian hy- Cloudy and quite warm.

May 25th. All plums are in full bloom and promising for a full crop of fruit. Duchess, Tetofsky and Whitney No. 20 crab are showing some bloom. Cloudy most of the day.

May 26th. Open bloom is fast increasing upon Duchess, Tetofsky and the Siberians, and bloom is showing a little upon the Wealthy and some New Russians, and have commenced to fade upon the Cheney plum. Up to this time have not noticed any bees and but very few insects working upon the bloom. Forenoon clear. Afternoon cloudy, with light rain.

May 27th. The bloom is falling off the Cheney plum and some flowers are open upon the Haas and other varieties of apples. Has rained steadily until noon since day before yesterday.

May 28th. The Duchess and Tetofsky and Siberian apples are about in the fullest bloom and the petals are fast falling from all plums. The ground is white with them.

May 29th. McMahan White apples and choke cherries are coming into bloom. Weather fair, but colder.

May 30th. The bloom of the apple trees is now at its fullest and petals from the earliest flowers are beginning to fall. Have rain in the forenoon and the thermometer indicates freezing.

June 2d. Frost this morning and colder. Apple bloom is holding on well.

June 4th. Warm and fair. The bloom has pretty much fallen from the fruit trees. There are some bees and multitudes of small flies and other insects swarming about the remaining flowers.

June 8th. Very warm, mostly clear day. The Windom dewberries are showing some bloom. Examination shows that the plum crop will be pretty much a failure. The fertilization has apparently been imperfect and the fruit that has set does not have a healthy appearance.

June 11th. Snyder blackberries are showing some bloom, also blackcap raspberries.

Plums are presenting a singular appearance. Some varieties have the appearance of being loaded with fruit nearly full grown; an examination shows them to be like green puff balls. Cheney, Le Duc, and Rollingstone appear to be the worst affected; some of the poorest wild varieties and latest bloomers the least. What is the cause of it? Some say the frost of June 2d.

June 13th. Blackberries are in full bloom.

June 15th. Wild grapes are in bloom. Some wild strawberries are ripe. Warm, growing weather.

June 19th. Concord grapes are just commencing to bloom. Pick first ripe strawberries.

June 20th. Some flowers are open on the Delaware grapes, other varieties are coming on rapidly. Weather continues warm and the ground is wet so that vegetation is pushing rapidly.

July 20th. Blackcap raspberries are getting ripe.

August 27th. Worden and Moore's early grapes are commencing to color.

August 29th. Concord and Delaware grapes are beginning to color a little upon some hills.

September 10th. The Moore's early and Worden grapes are so nearly ripe that a portion of them could be gathered for market. The first ripening of the Concord and Delaware will be but two or three days later, but the weight of the crop is so far from ripe that we have but little hopes of saving it.

September 15th. Sent first picking of Worden grapes to market.

September 19th. Commence marketing Concord and Delaware grapes.

In comparing the season of blooming with 1887, I find that in 1888 the time in blooming of Juneberry, plums and cherries will average about 20 days later, Transcendent crab, Duchess, Tetofsky, and Wealthy apples from 19 to 21 days later, blackberries and blackcap raspberries 27 days later, and Concord grapes 25 days later. I have no statistics to show the difference in the period but think that it did not vary much from the difference in time of blooming.

RESULTS.

Fruit of the plums and Siberian crabs did not appear to set as well as usual; berries of all kinds, grapes, Duchess, Wealthy, and Tetofsky apples better than usual. On low, undrained grounds the apples dropped badly during the latter part of June, but on elevated and dry grounds there was generally a good crop of the Duchess, Wealthy, and Tetofsky apples. Siberians and McMahan White were a light crop. Strawberries, raspberries, and blackberries were a good crop. Grapes were an immense crop, but in most instances failed to fully ripen. But very few plums came to maturity. The De Soto did the best. The season was noted for its cold and backward spring, excessive wet summer and dry fall. All fruits retained their bloom considerable longer than last year.

Mr. Allyn. There is a good deal of work we are hurrying over. A part of you know where I belong; that is in the cabbage patch. This vegetable department is a mommoth concern; it covers every thing. We are taking up a great deal of time with fruits and flowers, shade trees and shrubbery. That is very well but some of us that came to Minnesota to make it our home and have had to contend with the elements and insects of all descriptions, would like to be heard as to what we are doing. These are important subjects to be considered by gardeners if not by those interested in fruit growing.

President Elliot said Mr. Allyn would be afforded a chance to talk upon the vegetable topics in due time, but it was necessary to follow the program as closely as possible.

On motion of Col. Stevens the meeting adjourned till two o'clock P. M.

MINNESOTA

STATE AMBER CANE ASSOCIATION.

TWELFTH ANNUAL SESSION,

HELD AT MINNEAPOLIS, WEDNESDAY, JAN. 16, 1889.

The twelfth annual session of the Minnesota Amber Cane Association was held at Market Hall, Minneapolis, on Wednesday afternoon, Jan. 16, 1889.

The Association met at 2 o'clock P. M., and was called to order by the President, Capt. Russell Blakeley of St. Paul.

The minutes of the last annual meeting were read and approved.

Prof. Porter, the Secretary of the Association, stated that a full report of the proceedings, with the discussions and papers read, would be found in the last annual report of the Horticultural Society.

The report of the Treasurer was read, showing a balance of funds on hand of fifty-seven dollars and fifty cents.

Mr. Seth H. Kenney was called upon for some remarks. He said:

REMARKS OF MR. KENNEY.

Mr. President, and Gentlemen:

I can think back to the time when there was so much interest taken in the Amber Cane industry that this room would hardly hold the persons that were present and wanted to know about it. I have worked along in Minnesota for thirty years, and I think

I can now say it has passed the experimental stage. From what I can see and what others can taste, it may be considered an industry that is well defined, and the machinery for making it is a perfect success. Two hundred gallons of syrup, worth at wholesale forty-five cents a gallon, is not an uncommon thing with men that have the latest and most improved machinery. You all know that the product of the cane grown here in Minnesota is something you never need to be afraid of. The stocks of syrups kept on hand by our dealers have been glucosed to death, if I may say so. They are pronounced by the state board of health as unhealthy, and although beautiful in appearance, are unfit to use on our tables.

I am looking for and expect to see a great revival in the Amber Cane industry. It has been tried for a good many years; people have worked along with no experience and without anyone to guide them; the business has had to be worked up, and I have brought up samples from year to year, and have worked at it right along for thirty years, and I have more confidence to-day in the industry than I ever had before, especially for Minnesota. I find after inquiries among cane growers from various sections of the country, that a man can make syrup here and give away one-half of it for making, and still have twenty more gallons to the acre than they can in states further south. Eighty gallons to the acre as a rule is an average yield for Mississippi, Louisiana, North and South Carolina and Arkansas. I saw representative men from those states at New Orleans, and they gave as an estimate eighty gallons to the acre as an average yield; while we frequently get two hundred. I got last year from two acres and a half of ground, five hundred gallons of syrup that weighed eleven and three-quarter pounds to the gallon.

I consider Porter's steam evaporator ahead of any vacuum pan that costs thousands of dollars. This reduces the juice by means of steam. A great many people are using steam from the boilers of their threshing machines to boil their syrups. Porter and Densmore make machines of all sizes, and are well able to fit out us farmers. They also have the tools for clarifying and making the syrup.

I don't know what you think, but I think it is a perfect shame that the states below us should send up their grain in the shape they do, in syrups mixed with acids and unhealthy things, when we can raise two hundred gallons of beautiful syrup to the acre. In the farmer's occupation there seems to be so much

competition that everything seems to be overdone but the Amber cane, and there is a field for supplying this whole Northwest. I will say that I am surprised that the farmers of Minnesota should neglect such an opportunity, and it is because they don't know what they can do. It is a simple matter, and the machinery is also so simplified for making that it isn't what it used to be on the Cook evaporator, that we couldn't take our eyes off hardly for a minute without burning its contents. Now with a steady steam pressure we can make a syrup of the best quality at the rate of a gallon of syrup a minute. I can boil ten gallons of juice a minute and produce a gallon of syrup that will weigh eleven and three-quarters pounds to the gallon.

I hope to see a revival of the sugar cane industry in Minnesota. I know there is money in it; I find and am more and more convinced there is nothing that pays as well. The fact that there is no opposition and not many in the business, shows that this is a field for young men that ought to be explored. There have been several young men at my works this year and some of them staid a day or two to take in the whole details of the business. A man going into this business of course ought to have some previous experience. Probably many of the men here that have some experience, if they knew a little more of the present system of working, would make a success of it.

I have brought up samples of my syrup, and if anyone wishes to examine it to know what can be made from Amber cane he can do so. It is pronounced by good judges to be almost equal to maple and the best syrup on the market.

Out of a crop of 7,000 gallons that I have made the past season it is nearly gone already, and I won't have nearly enough to supply my customers through the year.

As long as this state of things exists there is an unoccupied field that should have the attention of the young men of Minnesota. I know that the business is a perfect success, and if there is one that doubts it let him come to my place when the machinery can be operated, and it won't take but an hour to convince him that there is a field here in Minnesota that is unoccupied.

I have been asking Prof. Porter to take hold of this question and have its principles taught at the state experiment station. I think it is something the state should attend to. My idea has been that if the legislature should give us a bounty of five cents on a gallon for a marketable article of syrup, when they are bringing in the glucose syrup by the thousands of barrels, that

costs twenty-five cents, my idea is that the state could pay this five cents to those who would engage in the manufacture and save the twenty cents that is now sent out of the state to the glucose companies. In a year the state would save that money. It is sent out for syrups that are injurious to health and it would be a little bit of inducement to farmers to take hold of this new industry.

Now, we have the Early Amber sugar cane that seems to be adapted to this climate. We plant about the time we plant corn. We plant the same distance as corn and plow both ways, and attend it very much the same, and if the ground is well worked, it is a very easy matter to take care of it. If the ground is full of pigeon grass the cane looks so much like the pigeon grass it is necessary to take a garden rake and rake over the hill. I think the best way is to cultivate well and keep the pigeon grass out of the land. On most any soil in Minnesota the Amber cane flourishes beautifully.

I can say one thing, that I shouldn't have stuck to it for thirty years if I hadn't made it pay. I have built up a business that has cost money, but it would cost one-half less with men that understand making the machinery. It can be had of Messrs. Densmore Bros., of Red Wing. I say this although I have no interest in the machinery except for the farmers. I repeat that here is an unoccupied field in this great State of Minnesota for farmers that would return them thousands and thousands of dollars, that might be kept here at home instead of being sent away to purchase goods that are inferior and unpalatable.

President Blakeley then addressed the Association and said:

ADDRESS OF PRESIDENT BLAKELEY.

The Amber Cane industry is virtually on trial whether to exist or die in the future. as an industry among us. I have now, as I have always, had undoubted confidence in its success of this eventually, but it requires that men should have that undoubted confidence in it that they will be willing to put their hands to it and make it go. The industry may be said to have gone through a great many different kinds of experience since it was first commenced; and the most critical, too, in almost every locality,

simply because people had to learn everything of value to them in regard to the subject. The peculiarities of handling, how it is grown, the proper time and methods for cultivation, are all matters of experience; they are to be learned by men who follow this industry. The details can not be told you by any writer; it must be tried by the chemist until he knows just how it ought to be worked.

As to how the product of the cane should be worked is still a serious question, and is one that the government has expended a great deal of money upon and is still experimenting with; and we are gratified to know that they are making, under the circumstances, very good success. As one of the original parties in the matter I should have been delighted if our friend Prof. Collier had always been the chemist of the agricultural department of the United States. He was one of the men who believed in this industry and always had his heart and soul in it. Unfortunately we got a commissioner, after our friend Prof. Wm. Le Duc, of Hastings, went out of the office, who did not believe in sorghum and who was determined that there should not be anything done in regard to it while he was in the department. And yet the appropriation was made and the industry was maintained in spite of all he could do.

Under the administration of our present worthy commissioner, the Hon. N. J. Colman, we have had a man who has had the sugar cane industry at heart. A good deal of money has been expended, largely at Ft. Scott, Kas., where a very successful work has been done in making sugar, and syrup as well.

At Rio Grande, my favorite station in the United States, this industry has been continued; but the large plant, which cost two hundred odd thousand dollars, was finally condemned as a working plant and was sold to go to Florida; and my friend Mr. Hughes, the chemist of that institution and its sugar expert, has devised a style of machinery under the aid and supervision of the experimental station of New Jersey, Prof. Cook in charge; and the report was made in March, 1888.

We are always unfortunate in our knowledge as to what is being done in this industry by our neighbors and we hold our meeting a little before their reports are printed. But I hope before we have our report printed we will have information from them giving assurance of success, and I may be able to give some of the results of this season's work when our report is printed.

I wish to say to the members of the convention that I may

desire to avail myself of the information that I may obtain from Mr. Hughes, or Prof. Cook. I understand it cost about $12,000 to put up the machinery necessary to work the diffusion process. I would say the machinery for diffusion and evaporation were improperly proportioned, and they were hindered in that respect from making a very large amount of sugars. They had obtained the information necessary to make this process a success, if they can get four cents per pound for sugar, twenty cents for syrup, and forty cents a bushel for cane seed. They depend largely there on cane seed; they know what it is worth, and what it is for. They have a market for all they can grow; they have sold thousands of bushels. I hold in my hand a little illustration, if any of the friends want to see what is the process adopted by Mr. Hughes.

ADULTERATION OF FOOD.

I now desire to allude to what is becoming fashionable in these days. I am gratified that I have lived long enough to see that people are taking a little care of what they eat. It only required that the most stupendous frauds should be practiced upon us to bring us finally to fairly face this subject of the adulteration of food. We are new in it but it is not a new thing. I have at home a large French work, that is of the sixth edition, in regard to the subject of the adulteration of food, drugs, drink and meat. And it gives the component parts of almost everything that is used. It is an authorative work on this subject and is printed by authority of the French government. Everything has its accurate description that is condemed as forbidden.

Thank the Lord we have got into the conviction in this state that oleomargarine is not butter, and the legislature of our state has appointed a commissioner, who has during the past year done a very good work in trying to have good milk and good butter sold in the state for the consumption of our people.

I was at the meeting of the dairymen's association at Faribault a few weeks ago, and also at the meeting of the state agricultural society last week, and the statements there heard as to the products of the dairy in this state were perfectly marvelous. It is certainly an immense interest that is challenging this attention.

The law provides that any oleomargarine sold in the state shall be sold as such, and only on a license. To sell without

complying with the law subjects the article to confiscation, and the party to punishment for a penal offense, in the payment of heavy fines.

It also reaches the question of milk. Very many experiments are made to see whether it is good or bad. There are a good many prosecutions. They do not come to the notice of everyone, but they are still prosecuted with a good deal of earnestness. It has been proposed that the state shall establish a universal inspection bureau to examine all the foods that are sold in the state. I hope that purpose may be accomplished; there is certainly great opportunity for it. Such legislation has been had in other states some time ago in this direction.

The State of Michigan, in 1881, enacted a stringent law in regard to the adulteration of foods, from which I read the following:

SEC. 4. No person shall mix any glucose or grape sugar with syrup, honey or sugar intended for human food, or any oleomargarine, suine, beef fat, lard, or any other foreign substance, with any other butter or cheese intended for human food, or shall mix or mingle any glucose or grape sugar or oleomargarine with any article of food, without distinctly marking, stamping, or labeling the article, or the package containing the same, with the true and appropriate name of such article, and the percentage in which glucose or grape sugar, oleomargarine or suine, enter into its composition; nor shall any person sell, or offer for sale, or order, or permit to be sold, or offer for sale, any food into the composition of which glucose, or grape sugar, or oleomargarine, or suine has entered, without at the same time informing the buyer of the fact, and the proportion in which such glucose or grape sugar, oleomargarine or suine has entered into its composition.

SEC. 5. Any person convicted of violating any provision of any of the foregoing sections of this act shall be fined not more than fifty dollars or imprisoned in the county jail not exceeding three months.

SEC. 6. It is hereby made the duty of the prosecuting attorneys of this state to appear for the people and to attend to the prosecution of all complaints under this act in all the courts in their respective counties.

When we shall have accomplished the same thing in this state, Amber cane syrups will be a common article of commerce in this country, and will be as profitable as any other article being produced.

I have gone through the experience. I have made the best Amber cane or sugar cane syrup that was ever offered in any country, when engaged in this business. I had all the appliances for making the best refined syrup of the same character made years ago by the old sugar establishments; and when a sample of it was sent to Prof. Moore, the chemist of a large sugar refin-

ing establishment in New York, he said: "We don't make that kind of syrup now." Said he "that is the best I have ever seen; it is as good as ever was made by any of the old sugar houses."

In Amber cane there is a larger proportion of what is called grape sugar than there is in sugar cane; hence, we shall have a larger proportion of syrup. And it will be of very great importance to the country. The amount of glucose brought to this country at the present time is almost beyond computation. We hardly know or realize the immense demand. Really there is no pure syrup except what little my friend Kenney and these other makers of Amber cane syrup make at home.

To make glucose a large steam vat is used; it is partly filled with water and say 6,000 pounds of corn and about one hundred and fifty pounds of sulphuric and nitric acids, which is boiled with the corn and forms the starch, or glucose substance that is made. Glucose may be chrystalized and may be mixed with sugar. It is very white when chrystalized, but it is largely sold as syrup. It is used in a great many ways, largely however in fruits. The persons who have been engaged in selling this product as a food for years past have been devising all sorts of means to take out or to destroy the effects of the sulphuric and nitric acids; they are giving their attention to it. And that is commendable, of course, because a man that has a conscience ought to be able to do something if he is going to sell an article to be dealt out to the family; he ought to be able to convince himself that he has not sold them an adulterated substance for food. The law in Michigan provides that it shall be examined; that the purchaser shall know whether it is adulterated or not.

When we get a law of this kind, glucose will cost a good deal more than it does now. Amber cane will have an opportunity to seek its own place in the market when it shall be necessary to make glucose a perfectly pure article. With a careful chemical process there is no doubt it can be. But when you are running through a thousand bushels of corn, the concern that does the handling may be instructed to put in so much material to take up the sulphuric acid, or some other agent; possibly they do put it in and possibly they do not. If they do they may take up a larger proportion of the deleterious substance used in the process of manufacture; but if they don't you get it if you buy the syrups, and your children have the benefit of it during their natural life; for it is not to be supposed that sulphuric acid is fit for food.

There is a bill that has been introduced in Congress — I think it is on the table in the house — which proposes to organize a chemical department which shall have most thorough control of this matter, all through the country, in regard to the adulteration of foods. I hope we may succeed in having something of that kind done. When we do we may rest assured we shall not only make our own syrups, but grow abundantly and profitably, and they will be a healthful article of consumption.

There is no difficulty at all in making these cane syrups as free from adulteration as anything can possibly be made. There is no use in manufacturing Amber cane syrups deleterious to anyone, and it will come, surely enough, when it is necessary to use nothing which will have any other but a beneficial effect when manufactured.

PROCESS OF MANUFACTURE.

One word in regard to the Amber cane sugar and syrup manufacture. I may say I spent considerable money in endeavoring to make it a success. But I became convinced years ago that the process followed was not the right one; that the diffusion process was the proper one. I may be able to tell you more about it hereafter than I am able to do now. The work of the chemist is very nice, and there must be great care to make it a success and get the benefit of the work, and get the sugar that will crystalize. It needs to be handled properly.

Beets make a good syrup for use, but the syrup is not practically a syrup to be put upon the table. But I think we have beets in this country that can be used for making sugar, and in the future the industry may be established among us.

My confidence for the future of this industry is that it shall be a success; that it is to continue in this country a firmly established industry.

I don't know that there is anything that I could say in regard to the process to indicate to you the best method of manufacturing what would be worth your while to take your time now. But I want to reiterate the statement made by Mr. Hughes, who was the chemist in a refinery in the city of Philadelphia. They had a very nice plant; many of the men there have been engaged in the industry during their lives, and thoroughly understand it.

Amber cane in Minnesota is yet ahead of all the different kinds of cane that have been grown; it maintains its place, and

virtually it was originated, as we believe, with our friends Kenney and Miller, of this state. I may not live to see the cane syrups the universal consumption of the state, but I firmly believe that many of you will live to see it. And not only that you will have your syrups grown at home, but the glucose, if you choose to make it, from the Amber cane or the early orange cane made in the future.

I am very much obliged for your kind attention.

Prof. Porter then addressed the Association. He said:

REMARKS BY PROF. PORTER.

Mr. Chairman: As was remarked by Mr. Kenney, the father of the Amber cane industry in the Northwest, this industry has passed beyond the experimental stage. Seven years ago there was not a room in this city which could be secured, that was large enough to accommodate all the people and farmers of the state who were interested in this subject,—this Amber Cane industry. In 1864 I met with a convention of sorghum growers from all parts of the United States, at Washington, and the delgates present numbered about four hundred of as intelligent and enthusiastic set of men as I have ever seen brought together. And now why is it, when we call for memberships in this Association we have only three names handed in? Is it because this industry has been proved to be a failure? By no means; it has, I say, passed beyond the experimental stage.

Many years ago it was proved that this was one of the most profitable industries that the farmer could engage in, in American agriculture. That was found out long years ago. It was at that time only prosecuted for the sprup. The question of sugar making had not at that time assumed any prominence. But the sugar question has long since been solved.

I remember at the meeting held here seven years ago, at just about this time in the month, at a hall just across the street, that Mr. John F. Porter, of Red Wing, a gentleman who had never seen a single pound of sugar swung out in his life, was present; he had never made a pound of sugar at that time. He was a tanner by trade; that was his business. But he become interested in the Amber cane business. And after that in a single

season he made fifteen barrels of as handsome brown sugar as was ever brought up for exhibition, or as you ever saw. And a barrel of that sugar was sent to Gen. Grant with the compliments of the Minnesota Amber Cane Association.

It has been proved to be a success so far as the manufacture of sugar is concerned. The process by which this result is accomplished, and the methods to be carried out by which it may be secured, are within the reach of any farmer's boy in Minnesota.

There is a demand for this product. We are sending out of our country every year a hundred millions of gold dollars to other portions of the world to bring back the sweets that ought to be manufactured here at home — paying this heavy tax to support others, when we have a soil just as suitable for the production of cane and sugar, and not only in the cane but in the sugar beet, as any portion of the globe. And why is it that this industry is languishing?

Permit me to call your attention to two things. In the first place there is the cheap labor of Europe employed in the beet fields there. That is one cause.

Another cause which is one of the principal hindrances to the manufacture of sugars and syrups here is the manufacture of glucose and its use for the adulteration of all the sweets we have in this country, which has reduced the price at which the syrup can be sold and the cost of the manufacture of it to such an extent that we can not compete with the glucose factories.

We know just exactly what we can do with Amber cane in Minnesota, and when we have overcome these two things it will be then a profitable industry in many portions of this country.

The Sterling Works at Ft. Scott, Kansas, this year have made 500,000 pounds of sugar from the cane. They have made about 1,000,000 gallons of syrup. They have done this at a profit of about $7.50 an acre, but out of that should come about $2 which the state pays as a bounty, leaving a net profit to the grower, not counting the seed, of about $5 an acre.

Now, the industry itself is well established, but there are certain guards we have to throw around it. And the first is to prevent the adulteration of this article. Why, gentlemen, you have no conception of the amount of adulteration that is carried on in food products. From the hat you wear on your head to the shoes on your feet this practice is carried on. Your shoes are soled with paper and your hat is covered with shoddy and your clothing is filled with it. And the moment you come to

anything you eat you find there is scarcely anything that is pure but salt; and I don't know but they will attempt to adulterate that with sand pretty soon. (Laughter.) You can scarcely buy a single ounce of unadulterated spices, or anything else you eat today. A few years ago I went into one of the largest spice factories in the country and was permitted to go through the establishment and see the process followed there of making spices. I happened to be in the rear where I saw perhaps a car load of cocoanut shells. And I asked the proprietor "what under heavens are you going to do with cocoanut shells?" "There are the shells and there are the spices, and of course the machinery unites the two!"

I won't take up your time with this question of the adulteration of foods by any extended remarks. I take it for granted that the State Amber Cane Association and the State Dairymen's Association have no interest to subserve except to stand up as beacon lights to protect the interests of the body politic. We of course meet together for the purpose of receiving mutual benefit; and we also meet for the purpose of giving the public the benefit of the facts and experiences; that is, we meet for a mutual interchange of views and sentiments.

Aside from any private interest that we would subserve or any individual benefit that we would desire to receive, growing out of these associations we have a duty to perform; and in the discharge of that duty we are to have in view our obligations to the state. I say, gentlemen, there is nothing more important for this society to do, than for its members to put themselves upon record and most vigorously upon record, in favor of the establishment of a commission in our state, looking to the prevention of food adulteration of every nature and form, and by every means that can be employed to protect the interests of the body politic. A resolution in favor of this project if carried to St. Paul and laid before the legislature with the public sentiment there is in favor of it, would have a marked effect, and in time we may hope to get suitable legislation upon this subject.

Now, when that is done the Amber cane industry as one of many others will receive the benefit, and why? Because we have this product from our own soil and its profits are returned to our own people; then, instead of coming in competition with poisonous material, when those articles are branded and put upon the market upon their own merits, our products will not have to fight for a market. Instead of forty cents a gallon the

market price would be up to the value of about seventy cents, the price of the best New Orleans. It would drive out these cheap and adulterated articles.

About ninety-nine out of every hundred will take a cheaper article because it is a little cheaper without regard to the quality. They don't know what they are getting, whether the best New Orleans honey drips, or whether it is more than half glucose. They are after molasses and anything that is sweet answers the purpose. When the dealer can sell a syrup at 25 to 30 cents and make a larger profit than on Amber cane syrup at 45 cents, he is going to keep the lower priced article. But the moment you put the brand of "poison" on the glucose just that moment Mrs. Jones and Mrs. Brown says she is not going to buy that even if it is a little cheaper. She takes the adulterated article now and don't know the difference.

I say it is to the advantage of this Amber Cane Association to strike the note of warning so as to protect as far as possible the innocent consumer.

Now while I am on the floor I may take a few moments to speak about some phases of the Amber cane industry in the state and I refer to the experimental department now. It becomes necessary to develop new varieties. We had no sugar made from the varieties of sorghum cane first introduced in this country; a few years ago Mr. Kenney and Mr. Miller discovered a variety of cane that matured much earlier and decidedly sweeter than was the common sorghum. And from that accidental discovery came the Amber cane. And if they could find a single head in a field that was of such great value, why may we not be able to originate other varieties still sweeter and earlier than Amber cane? There are some drawbacks to the cultivation of this cane. The first is the uncertainty of the seasons here. But there is no more uncertainty in the cultivation of Amber cane, than in that of corn, or potatoes. It is no more liable to suffer from this drawback than any other industry we have.

Now, it becomes necessary for our experiment stations to solve this problem of hybridization, and this last year we have been testing a number of new varieties; forty-two have been under cultivation. We were unfortunate in having a late spring and early frosts; we could not get the seed in very early, so we could not get the best results from early planting, but among the forty-two varieties we found one as much earlier than the Early Am-

ber as it is earlier than the old Chinese Sorgho, and very rich in saccharine matter. We propose to carry on these investigations until we can develop varieties adapted to all localities in the state.

I tell you, gentlemen, we have accomplished more here in the past thirty-five years in this industry in this country than was accomplished in a hundred years in Europe in the development of the sugar beet, and in a few years more no doubt most of these causes of discouragement will be swept away. In a few years, instead of importing one hundred millions of dollars worth of sweets to supply the people of this country, we will be exporting it by the hundreds of millions of dollars worth to the people of other countries.

Mr. Ridout. I would inquire as to the cost of making syrup?

Mr. Kenney. I work the farmers' cane separate and they pay in a share of the syrup. There is one thing I would like to speak of. I do not strip my cane any more. I wait till the leaves are partly wilted and I run the cane through with the leaves and without extracting the bitter taste. I save the labor of stripping. The cane is cut up and allowed to stand till the leaves show a shrunken appearance. Then they can be run through the mill, and we use one-fourth less lime in clarifying than if we work it up with the leaves stripped. It seems to draw out the impurities if left in the shock, and we make the syrup with less lime and consequently of a lighter color. I think that is the finest kind of syrup I can make that is made when the leaves are well wilted.

This industry I consider is away past the experimental stage. It can be made very profitable, and when you can make a good article of syrup there is a market for it. I would like to see many others take hold of this industry and carry it along. I don't intend to leave it myself.

Capt. Blakeley. Mr. Hughes gives an illustration of the machinery used in the establishment I have referred to. He uses the diffusion process. He had thirty-three acres of cane to work through the mill. He found he could not work up the cane successfully with the machinery he had. In that process the cane is cut into two-inch pieces and passed through a series of fans and the leaves are all blown away. In this way he gets rid of leaves and shives which carry a good deal of gum and extraneous substance, troublesome in manufacture. His diffusion battery cost $3,000, and the process he has employed works very satisfactory and complete.

Mr. Hughes states that he has succeeded by this process, which is largely his own invention, in extracting ninety per cent of the sucrose in the cane. He has not reached perfection yet, but hopes to get everything to work satisfactorily this year.

Prof. Porter. I would suggest, after a few bills are paid, that perhaps the best use we could make of the fifty dollars we have in the treasury of this Association would be to authorize someone to prepare a pamphlet setting forth the benefits of the Amber cane industry to the agriculturists of Minnesota, and scatter it broadcast through the state to see if an interest can not be aroused in this industry during the ensuing year. Can we make a better use of the funds that are lying idle in our treasury?

Col. Stevens. I don't understand that the Amber cane industry is confined to one or two growers in this state. My experience is, in traveling through the different parts of Minnesota, that in many neighborhoods, and in some communities, some portion of every farm they are raising patches of Amber cane, and many farmers are making their own syrups. They make enough for all saccharine purposes of the family; they do not buy New Orleans molasses any more. It seems to me the better way would be to make the attempt at least to have all the small farmers take some interest in this industry and to plant at least a half acre of cane for their own use, as many farmers are now doing in McLeod, Carver, Le Sueur, and many other counties of this state. It is attended with very little expense. It don't cost any more than to raise half an acre of corn, and $75 will buy the little mill and pans to manufacture with. It don't require any $12,000 or $15,000 for the purpose. I think there must be 75,000 or 80,000 gallons of syrup manufactured in Minnesota every year. One year there was reported to be 127,000 gallons. I found on investigating this matter that I was mistaken in supposing the industry was confined to the operations of Mr. Kenney, Mr. Porter, and two or three others.

Capt. Blakeley. There has been a good deal of manufacturing done in the state in a small way, which amounts to considerable in the aggregate.

Sorghum manufacturing commenced with the use of the Cook evaporator and it is still in use by some of our people. As in times past there are those who are making syrup in a small way for themselves and their neighbors. It is being sold to some extent in the stores and small towns. But that is not exactly such an industry as the people of the state ought to have. There are

large sums of money to be made out of this industry, and this can be brought about easily when there is an opportunity afforded for the cane product to fight its own way. The reason why I have had to surrender my business was, because when I went into the market to sell twenty or thirty barrels, for instance, the merchant would say to me, "that is the nicest syrup I have ever seen, but I can't make as much money from selling that syrup as in selling glucose syrup." The difficuly was to compete with the cheap syrups. The adulterated syrups were in the market at lower figures than the pure article could be sold for, and those who did not know the difference bought the cheaper article.

Mr. Kenney. In Le Sueur county there are men that have produced 3,000 or 4,000 gallons, and have found a ready sale for it. In Rice county, and all through the southern portion of the state, the Amber cane product is made and largely used. Of course it is not made in as scientific a way as with the new machinery that is now being brought into use.

I think we ought to have a committee appointed to look after this adulteration of food, and to present our wishes to the state legislature, and see if we cannot have something accomplished. I would move that our executive committee be authorized to take such action in regard to the matter of adulteration of food products as may be deemed advisable.

The motion of Mr. Kenney was adopted.

Capt. Blakeley suggested that the matter of using the funds of the Association be left to the executive committee.

Prof. Porter. I understand a circular is being prepared by Densmore Bros., of Red Wing, in regard to the sugar cane industry, which will perhaps cover the ground.

We had the promise of some remarks on Apiary Culture from Mr. Urie.

Mr. Urie then came forward and addressed the Association.

APIARY CULTURE.

By Wm. Urie, Minneapolis.

Mr. President, Ladies and Gentlemen:

I feel inadequate to undertake the task of doing justice to so great a subject as that of apiary culture. It is a subject that to me seems of great importance. It is a subject that I have studied for over forty years. I see in this hall to-day another gentleman that has also made it a study for some forty years, and in making a few remarks here I feel that my time is limited. I could occupy one hour easily and not exhaust the subject. But I will endeavor to be brief and take as little of your valuable time as possible.

In the management of bees the first thing to be considered is a location. A great many men lay great stress, and perhaps too much, on location. What I mean by location is this: At the time you are first engaging in the business you should ascertain the varieties of flowers that secrete honey, and the time of the year when those flowers come into bloom. In order to get a crop of honey from those flowers you must have the bees at the proper time to gather the honey. The flowers only *secrete* honey while the bees *gather* it.

In order to get the right condition they have to be properly managed during the winter and spring. I claim there is as much in bringing them through the winter and spring—or more, in fact—than in all other management put together. It is of the greatest importance to have a large body of bees when the flow of honey comes on.

In this country, at least in some portions, and where I am located, the largest flow of honey usually comes from the white clover. The flowers commence blooming from the first to the middle of June. Some years it commences at the first and in others not until the middle. And yet you scarcely find any honey in the clover until in bloom about eight or ten days. It lasts generally until the tenth or fifteenth of July, making a comparatively short space of time in which the bees must collect their store of honey. But if your colony is in the right condition and has a large body of bees, there will be no trouble to get the honey, if they are rightly managed.

Therefore to get the bees, and to get them at the proper time, you must have them properly wintered and brought through the spring. On the wintering of bees a great many articles have been written, as well as upon the swarming of bees; and a great deal has been said upon the subject by experienced apiarists, and yet the subject is not thoroughly understood. A great many men meet with good success while others make failures.

I claim that if a swarm of bees is housed in the fall of the year in good condition, with plenty of good, ripe honey, well sealed over, in a proper place, the swarm is almost as certain to winter as a horse or a cow. But how many swarms of bees are put into winter quarters in this condition? A great many men don't know really when they are in this condition. At times the honey is poor—is not of the proper thickness. If that is the case, the air or breath of the bees that arises from them passes up the sides of the hive and sours the honey. You will frequently find the honey soured in the hive. If that is the case you will usually find them in bad condition, and in the spring you will find what is called dysentery among the bees. And if they get this disease they are very sure to dwindle away rapidly in the spring. The consequence is you have lost the value of your bees.

As the queen is the mother of the whole colony, laying from 3,000 to 4,000 eggs in twenty-four hours, it is the imperative duty of the bee-keeper to place the surroundings of the hive so that the queen can lay those eggs and get the bees on hand when this flow of honey takes place. This is the point that every bee-keeper wants to learn.

It takes twenty-one days from the time the egg is laid until it becomes a bee. When first hatched it is not a full bee; it is a baby bee. The older bees take honey, partly digest it and feed these baby bees four or five times a day. About the fifth or sixth day they take their first flight. They return again to the hive and are then prepared to go to work as nurses or to build comb. It is the young bees that almost entirely build the comb and those that do the nursing.

Take an old swarm that is forty or forty-five days old and you get little comb from them. Place them in a hive and feed them sugar without comb and they will not build comb half as fast as do younger bees. Therefore, as it takes twenty-one days to raise your bees after the eggs are deposited, and five or six days more are required before the young bees are old enough to leave the hive, it will take in all about thirty-five days after you com-

mence operations before the swarm is prepared to gather honey. Therefore you want to commence as early as the first of May to get the bees in condition, to get the queen to lay to her full capacity, so the bees will be on hand and ready for this honey flow.

A good many men perhaps disagree with me on feeding, but I am a firm believer in stimulating the bees by the use of proper food. I can take a swarm of bees and if it is properly managed — bear in mind that it must be managed right — and I can set a queen that is only laying 300 or 400 eggs a day to laying from 3,000 to 4,000 eggs a day. I can tell the number of eggs that are deposited by counting the cells — so many to the square inch.

I see a good many bee-keepers here, and let me say to you, busy yourselves in that matter so that you can stimulate your queens at the proper time.

After this flow of honey is over, have the queen do as little laying as possible. Why? Because the bees raised at that time are useless, only honey consumers. Where Mr. Taylor is located, in Fillmore county, they have a flow of honey in the fall; we don't have it here. I have been here six years. The first fall we had no honey to amount to anything. There may be a better flow of honey in the fall in places, than in the summer, but the honey is of a darker color.

This past season there was very little pure white clover honey. There is a sample case on the table; I only had a few cases taken off. You may inquire what has colored the white clover honey this year; it is the golden rod; there is a large amount of pollen in it. The bees get it all over their bodies, and they leave it upon the comb, casting that yellow shade upon it. It does not hurt the quality of the honey, but it hurts it in looks.

In feeding in the spring of the year I differ a good deal from many other people. I have managed bees in such a way that I can feed promiscuously, and yet in my articles in the "*Farm, Stock and Home*" I advised new beginners not to do it. There is danger of setting the bees to fighting, and if they do it is hard to break them of the habit. As far as I am concerned I have no difficulty in keeping them from fighting. I put one or two pailfuls of feed where they can get it, and take it to their hives; but if you are to find no symtoms of fighting, it has to be done just right. When one gets a large apiary of bees to fighting it is hard work to break it up. My advice is to feed under the cap at night, although the best way is to let them gather it naturally.

If you can get a swarm that comes through properly in the spring, if a full swarm, it will have from 40,000 to 60,000 by the tenth of June and you will then have your colony all ready for a heavy season's work. But how many times do you find them in that condition? In many instances you will find them with their brood in only one or two sheets and bees in three or four, when the hive should be full.

This last year was one of the worst seasons I have ever seen for bees; it was so cold. The bees had to cluster together, and it was almost impossible to induce the queen to lay vigorously. But by the the twentieth of June I had my queens in very good condition — ten days later than it should have been.

I might here make a great many remarks upon this bee question; it is an important one. It is a question very little understood by the mass of people throughout the United States. Had you seen some of the letters received by me this last summer you would have been surprised at the ignorance of some people upon the subject of the honey bee. I am often surprised by the ignorance displayed in some of the questions asked me.

As I stated here last year, there is nothing that is like the honey bee. You may talk of your amber cane products; that is all very good. But, gentlemen, if the people would take hold of this bee question, and take hold of it intelligently, as they would any other kind of business and treat it properly, they needn't go to raising amber cane syrup; they can have plenty of sweets and of a quality that, in my estimation, is far better than all the amber cane in existence. And they can have it cheaper than they can produce amber cane syrup, every time. But the subject is yet comparatively new and there is little interest taken in it. The business is in its infancy, especially in some of the states. In some of the Eastern states they hold their bee conventions and there are many engaged in the business.

Here is Mr. Taylor who has prospered in the business, and others. There are some new beginners in the state that are taking an interest in it. I believe in twenty years from now where we have one ton of honey produced, there will be hundreds of tons and it will become a common article of food.

Most of us American people do not know how to use honey. When it can be had for ten and twelve cents a pound it is cheaper than butter, and it is a much healthier article as well as cheaper. I will say this and I can prove it, that you will not find an instance where a man has a family using honey freely, where

there has been a case of diphtheria or sore throat. There is no mistake about it but that it is a cure for diphtheria. Not that I am advocating the use of honey as a medicine. I have always raised it and sold it as food, and there is nothing better than honey. Excuse me for talking so long.

Mr. Ridout. I would like to ask this gentleman some questions. What time do you put your bees in the cellar and when do you take them out, and do you cover the hives with anything in the cellar; how do you manage them; at what temperature would you advise a cellar to be kept?

Mr. Urie. I have no cellar. I have a building of which you will find a description in the September number of "*Farm, Stock and Home.*" If you will build one on the same plan I guarantee you will have a perfect place to winter bees. It is necessary to have a dry place with pure air and it should be above the ground. If wintered under ground, in damp cellars, the combs will become mouldy, the honey sour and thin, and the bees liable to disease, often causing the loss of the colony.

A building 12x24 and eight feet high is large enough for one hundred and twenty-five colonies, and for an ante-chamber in the front part. I choose a good dry place, near the centre of the the apiary, putting the building on a wall six inches above ground; sills 6x10 will answer; I leave a ventilator open on each side to keep the floors dry in summer; I close them in winter and bank the sides to keep out frost; use 2x2 for studs, using dry lumber, and board on outside with drop siding and on the inside with matched stuff; use a shingled roof; put in a window on each side and use double doors. I use ventilators to keep the temperature as near as possible from 45° to 50°. This winter it is too warm as it is ranging from 50° to 55°. I don't need a thermometer as I can tell the temperature by the action of the bees. When you go in and find the bees buzzing it is too warm; but with right temperature they will be perfectly quiet and in a dormant condition. If too hot or too cold they will roar, and if it gets too warm I leave the doors open at night.

Col. Stevens. How is it with the wild bees in the woods; do they have the proper amount of ventilation when found in trees?

Mr. Urie. When you find a bee tree in the woods you find rotten wood, and the perspiration passes into the rotten wood; in the hive we have nothing of the kind.

Mrs. Kennedy. Mr. President, I don't hardly agree with the gentleman in his statement that there is more money in keeping

bees than in growing sorghum. He speaks about going into bee raising "intelligently;" I know of a good many in our section of country that must have gone into the business intelligently, because they have had books and studied it up. They made a success of it for awhile, but there is some doubt and uncertainty about it, for in the spring now and then they will lose two-thirds of the bees.

Now, we have been in the sorghum business a number of years and we have never lost a crop, never! There has been no uncertainty about it, and this last year from one acre and a half of ground we raised four hundred and forty gallons of nice sorghum. I have a specimen of it here. This is home made, by using an open pan, with nothing to clarify it — except a skimmer. I think it a very nice specimen. It is not made by steam although we get up considerable *steam* in working it. (Laughter.)

Mr. Kenney. That is the finest crude syrup I ever put eyes on.

Prof. Porter. It was the woman in it!

Mrs. Kennedy. There has never been a failure since we began; and when we are making the sorghum customers come after it, and we can sell it at sixty cents a gallon; and when shipped to a distance it brings forty cents, and they pay for the barrel. Just the day I came down here we had an order from Big Stone county, from a large firm there, and they stated they would take all our crop. And it seems to me this is better than raising bees. Just as soon as we get nicely started something happens to take our bees off. Perhaps we are not "intelligent," but it doesn't take so much intelligence to make syrup, so I think we are just a little ahead. (Laughter.)

Mr. Gilpatrick. And you don't get stung either.

Mrs. Kennedy. Another thing I would like to say is this; one trouble with the people in our part of the country who engaged in the sorghum business was, so many went into it in the first place that we found that everybody was "raising cane." (Renewed laughter.) They didn't go at it in an intelligent sort of way, and they made stuff just as much worse than New Orleans black-strap as you could imagine, and of course everybody was disgusted. But we are now making a success of it, using our small pans; and if you will give us a little time we will prove to you that sorghum is a success in Minnesota. (Applause.)

Mr. Ridout. The outfit used by this lady only cost about two hundred and fifty dollars.

Mrs. Kennedy. We make from eighty-five to a hundred gallons a day. We don't run it in the evening. By getting up early we can make a hundred gallons in a day, easily.

Mr. Wilcox. It is perhaps a proper time to make a comparison. I would like to call upon Mr. Danforth to tell us the results of "cultivating" and caring for his bees.

Mrs. Kennedy. I would like to make one further remark. I heard a gentleman say that he didn't think Amber cane and horticulture would run very smooth together. But I want to tell you that a mulching made from the cane is the nicest mulch in the world, and I think it just fits in nicely. (Laughter.)

Mr. Kenney. I remember that I set out some Wealthy apple trees and mulched them thoroughly with the Amber cane and I got a bushel of apples from some of those trees, without any further attention.

Col. Stevens. Do you mean by using the begasse as a mulching?

Mr. Kenney. Yes; when I set out the young trees. The begasse from the Amber cane was put around the trees to mulch the ground. I guess the trees bore themselves to death for I haven't had any apples since. (Laughter.)

REMARKS OF MR. DANFORTH.

Mr. Danforth. I am sorry to be called upon to speak upon the bee question because I am an amateur. I am not entirely in the bee business; I am in the civil engineering; for since I came to Minnesota I see so many chances for people to make money that I like to dabble in everything. I have too many other things perhaps. I spoke here last year but I haven't been at home but six days to call it being at home since. I depend upon my wife to take care of the bees and some Swede help.

Last spring we took out 35 or 36 colonies of bees. I said if anybody wanted them at $6 a swarm they should have them as I wanted to reduce my stock to 15 or 20 swarms. We sold some and put the rest to work.

To make a long story short I will give you some of the results; that is what everybody wants to know. I have tried a little sorghum. We have tried to raise a few raspberries; we have some dewberries too. But they are not very profitable any of them except these thirty-six colonies of bees. I have different hives; I have the Simplicity, the Langstroth, and a good many

other kinds. I have some eight kinds of hives, but have settled down to the Langstroth.

I winter my bees in the same manner as Mr. Urie. I raise the hives and allow a space for the bees to drop down and have never lost a swarm where I followed that plan. I make a frame an inch and a half to two inches high and set the hive upon that. I give good ventilation.

The result of the summer's work is this; we have averaged ninety pounds of honey to the hive. Some of it is very nice. My experience in bee culture has extended over about twelve years. The lady over there speaks of bad results; that is we sometimes lose our bees. Whenever I lose a swarm I think it is my own fault, through negligence or ignorance. During the past two years when so many complained of losses I did not lose a colony. But I calculate to know their exact condition. In this way I make my bees pay me from eight to twelve dollars a colony. I calculate anyone can make two hundred per cent upon their investment; that is my idea of the bee story. But I am not a bee man as my business is mainly in something else.

One needs to study and learn the habits of bees in order to succeed. People may get a dozen or twenty colonies and then become discouraged because they don't understand how to take care of them.

We ought to have a bee-keepers association, so the bee men could meet together and have a sort of experience meeting and relate their successes and failures. We need something of the kind to keep up our courage. My father was a pretty good bee-keeper and I recollect a good many things I learned when I was ten to fifteen years of age.

Mr. Taylor said he would favor the organization of a bee-keepers association. There were a good many bee men present, and they ought to organize such a society before the delegates returned to their homes.

Mr. Wilcox. Mr. President, I wish to say that Minnesota is very favorably situated for the production of honey. In the month of September last, in many localities, especially along the river bottoms, the flow of honey was remarkably good, while the product from the white clover was the lowest in importance. At my apiary, at Hastings, my bees make more honey during that month than in any other, and it is of great value. From my back door I can see hundreds of acres of wild flowers at that season of the year. Here is where they get their great flow of

honey. They won't look at the best sorghum that may be placed in their way. As to results I would say that my apiary has averaged about one hundred pounds to the swarm, besides doubling the number of colonies, the past season. I never allow the bees to swarm naturally. I try to treat them intelligently, and that is the result of the season's work. This is largely extracted honey. During eight days in September I extracted twenty-five pounds to the hive on an average. I took some comb honey, but I run mostly to the extracted article.

Mr. J. G. Bass, of Hamline, was called out on the question under consideration.

REMARKS OF MR. BASS.

Mr. Bass. I have been in the habit of keeping bees since the spring of 1855. I commenced with one swarm, and I have continued in the bee business ever since. I find it about as profitable a branch of industry as I have ever struck. I have tried the sugar cane industry and don't succeed very well. I find it takes more help to produce the amber cane syrup than it does to produce pure honey. A great many seasons I have made a large amount of honey.

In my former location in Scott county, where there was a large amount of basswood timber, our largest flow of honey came from the blows of basswood trees. Our finest goods came from that source although the white clover is very good. Since I have moved to Ramsey county we have nothing but the clover for the bees. Therefore the honey season is short.

Many years I have sold hundreds and hundreds of dollars worth of honey with but very little effort. I have never, with one exception, swarmed artificially. I tried it one year and didn't succeed well and I prefer to let them take their own course, watch and hive them. It commonly takes two or three weeks, most of the time during the swarming season, when of course you have to be at home to attend to them; even on Sundays. If you go to church you are liable to lose two or three swarms.

I recollect one year there was something of an excitement going on at Minnetonka and the rest of my folks went out there on the Fourth of July. I said I would stay at home and take care of the bees; I did so and when they came back I had five nice swarms; and I thought I was very well paid.

I will say this, that it is not every man that will succeed in

keeping bees. There might be a dozen in the room who have had some experience with bees. One man will get along all right while another may fail entirely. The trouble is that many undertake the business without paying attention to it or being schooled in it; we have to learn all these things before we know them. You cannot tell the movements of the honey bee unless you observe them, and know how to manage them under different circumstances. Those who do understand their habits and who care for them properly will succeed. I think it is the easiest money that is ever made which comes from the little bee.

The Association then proceeded to the annual election of officers for the ensuing year.

ELECTION OF OFFICERS.

On motion of Mr. Kenney, the present list of officers was elected, viz.:

President — Russell Blakeley, St. Paul.

Vice President — Ditus Day, Farmington.

Secretary and Treasurer — Prof. Edward D. Porter, State Experiment Farm, St. Anthony Park.

Executive Committee — Russell Blakeley, Ditus Day, Prof. E. D. Porter, Seth H. Kenney, J. F. Porter.

On motion the Association then adjourned.

AFTERNOON SESSION.

WEDNESDAY, JAN. 16, 1889.

President Elliot, upon the adjournment of the Amber Cane Association, stated there was time for a short session of the Society. They would now be favored with some remarks from Prof. Ragan, of Indiana, who had something of interest for the class of young students present, from the new farm school. He therefore took much pleasure in introducing Prof. Ragan, secretary of the American Horticultural Society.

Prof. Ragan then came forward and addressed the Society.

HORTICULTURE FOR BEGINNERS.

By Prof. W. H. Ragan, Greencastle, Ind.

Mr. President, Ladies and Gentlemen:

During the few hours that I have so pleasantly and profitably spent with you, yesterday and today, I have heard from a number of gentlemen and ladies upon their experience in the culture of various crops, all of which has been interesting; but I now propose to give you, somewhat briefly, a little of my experience in the culture of a crop of young horticulturists that for a time were submitted to my care. This is really a most important crop, and the most important, Mr. President, by all odds that we can consistently embrace under the very general term of horticulture.

Some years ago the leading literary university of our state, prompted by a very liberal bequest it had just received, added several new departments to its already numerous schools and colleges. Among these was a school of horticulture. Your humble servant was called to the head of this new department. With no experience as a class room instructor, and, indeed, without preliminary education fitting me for such a position, and in a school where no industrial arts had yet been taught, I frankly confess that I was put to my wit's ends to devise "ways and means" for overcoming the dilemma in which I was placed. I must proceed without text books or curriculum, and by assuming that the student was somewhat familiar with the related sciences — botany, geology, chemistry, meteorology, zoology, etc., or that he was to receive such instruction from the proper teacher, I only proposed to give him practical hints which might enable him to apply his scientific knowledge to the every-day affairs of after life.

I will give you a hasty outline of the numerous topics presented in my lectures to the class, merely hinting at the various methods resorted to in order to hold the attention of the student and to enable him to make the application of the lesson, in case he should ever engage in horticulture either as an amateur or as a professional.

Horticulture is an art, not a science. It is a branch of agriculture and includes pomology, vegetable gardening, landscape gardening, floriculture, the propagation of trees and plants, or the nursery, forestry, etc.

The botanist studies the structure and habits of plants with a view to their classification and scientific arrangement. For this purpose he prefers the natural plant—the one which best represents its species and not the cultivated plant. In this particular he differs from the horticulturist, whose greatest delight is in causing nature to succumb to the influence of his arts.

The botanist pursues his highest scientific investigations through a study of Nature's production; perhaps the wild rose with its simple flower of five petals, and, as a scientist, fails to admire the gaudy queen of the garden, while the horticulturist finds his greatest delight in producing the widest deviations from nature's ways.

Our handsome flowers and luscious fruits are the products of the "art which does mend Nature." In the language of an intelligent horticulturist of a neighboring state, "Man plants and prunes, cultivates and grafts, and (may I say without irreverence) creates new fruits and flowers. A pippin is at least a manufactured article."

Varieties are the result of domestication. The apple of the forests of Europe, from which our numerous varieties have sprung, was scarcely an edible fruit; and had it remained uninterrupted in its natural forests unto this day it would have continued to reproduce its species (*pyrus mălus*) with the same and almost definite character of its offspring as characterizes our maples and beeches of the wild woods.

But the liberal hand which has so bounteously blessed us with the luscious fruits and beautiful flowers of our gardens, wisely designed that we should learn, to some extent, through acquired skill and knowledge gained by experience and observation, an influence over these wild species, which should enable us to so modify and change their natures as to better please and satisfy us. So man sought a better fruit than he found wild about him when he transplanted the crab into his garden; and from repeated propagation and careful culture, husbanding with jealous care every advance, he has slowly but surely led the captive far away from its original type, until we, in the happy possession of of our pippins and pearmains, have almost forgotten their lowly origin and the patient labors of those who have, through their intelligence, wrought these changes.

This we term an art—the art of horticulture. First we have a simple species; from this we develop the distinct variety.

If we plant a seed of an apple we expect, as a result, an apple

tree. It may be, as to quality of fruit and other desirable characteristics, a great improvement upon its immediate progenitors; yet it is an apple, nevertheless.

We call this a variety. Varieties of a marked character result, as shown above, from the ameliorating tendencies of what we call domestication.

If, therefore, we plant seeds, we multiply varieties of the species to which the seeds belong.

These new varieties do not all prove to be better in the desirable qualties than were the parents. Indeed, with all our arts and skill, it is only the rare exception that rewards our labors with satisfaction, while the "ninety and nine" may show decided tendencies to degeneracy, for nature is ever struggling against us.

It will be seen, therefore, how uncertain, even after securing a valuable variety, are we in its possession, as with the growth or decay of the original tree or plant would come the certain loss of our favorite variety. But here again art comes to the rescue; as with the slow but steady advance of knowledge and skill in the production of desirable varieties comes also our skill in their perpetuation and multiplication either by natural or artificial propagation, for while we can only propagate a species by planting the seeds, we propagate a variety by other and often purely artificial means.

There are classes of fruits and plants which we cultivate and admire that, when established in a distinct or desirable variety, are self-propagating. To this class belong the strawberry and raspberry: the one through its runners or off-shoots, the other by tips and suckers. These and many others propagate in this way, and rapidly, without artificial means, while the gooseberry and currant, and many other of our small fruits, shrubs, etc., are self-propagating, but, unaided by art, are less rapid in their multiplication. With some we practice layering as a means of extension; others we propagate by cuttings, and there are yet others with which we must resort to even more difficult and strictly artificial methods, such as budding and grafting, if we would enjoy a continuation of a desirable variety; and there are still others which require even greater skill and ingenuity, with appliances and fixtures rendering their propagation critical and expensive.

But Nature has placed bounds and limits, beyond which we cannot go. While we may materially change the habits of a

species in the production of varieties and in their subsequent extension by propagation, we must follow the line of affinities in the selection of stocks on which to propagate. No human skill will ever succeed in causing a peach tree to grow on an apple stock.

Nearly related species of a genus, as the pear, apple, quince, or hawthorn, or, as the peach, plum, apricot, and other stone fruits, can be used as stock — the one for the other — but far better results may always be expected from the pear on pear, apple on apple, peach on peach.

With the propagation of varieties comes the care and culture of the young and tender plants. This is the work of the nurseryman. His skill consists in the care, culture and training of the plant or tree to that age and strength of constitution fitting it for transplanting into the orchard, the garden, the forest or the pleasure ground.

After the propagation of one tree or plant, comes the most dangerous and critical period through which our favorite is destined to pass, the transplanting of it from the nursery to the permanent grounds. Great skill and an intelligent understanding of the wants and habits of the tree or plant are here required if we would obtain satisfactory results. But our cares do not end here. Much will depend upon our judgment and wisdom in the selection and preparation of our grounds, and in the after-care and attention bestowed both upon the soil and its occupants.

The related sciences, always valuable auxiliaries, will now be most potent aids, for a practical knowledge of geology and botany will aid us in laying a good foundation — the one in the selection of soils, the other in determining the species adapted. A study of meteorology and zoology will guide us in providing against the vicissitudes of our climate, and in warding off the attacks of insects and other animal pests. Some scientific as well as practical knowledge of vegetable physiology and the laws of plant growth, will enable us to prune and train intelligently. Pruning should be disciplinary or curative, disciplinary in guiding the young tree or plant in the way it should go; curative in removing dead, maimed or diseased parts. In either case, as with the skillful surgeon, the highest aim should be the shedding of the least possible blood. Quack horticulturists and quack surgeons often make serious work by the too free use of the knife.

In esthetic horticulture the reward of our labors is in the pleasurable enjoyment we feel in its results. Our pleasure is proportioned to the degree of culture we enjoy. We designate those who follow horticultural pursuits from this standpoint as amateurs.

Economic horticulture offers a more substantial reward in her golden fruits. While those who have a natural adaptability to the calling will usually succeed best, there are many who follow horticulture for the living they find therein. These we call professional horticulturists.

In either case, to best husband the result of our toils, we must know how and when to harvest our crops and what disposition to make of them afterwards in order to reach the highest fruition of our labors.

I have now briefly outlined the course of study which I have followed as a teacher of horticulture.

Each process, in the progress of the course, was illustrated as fully as it was possible to do by a practical application of the lessons taught; yet we have labored under the great difficulties, which might naturally be expected, in inaugurating a new department in an institution of the character of the one I had the honor of representing.

It is quite probable that but few of the students whom I have taught, will follow horticulture as a pursuit, yet I tried to impress them with the thought that, in the years to come, they may look back to the simple lessons they now receive with pleasure, if not with absolute profit; for, after all, we recognize and admire the person as fulfilling, to the highest degree, our ideas of a useful and well developed man or woman who has a practical knowledge of what we term every-day affairs.

The remarks of Prof. Ragan were greeted with applause.

Prof. Porter extended an invitation to the Society to visit the experimental station and the new school of agriculture on Friday morning, stating that teams would be in waiting at St. Anthony Park to convey the visitors to the farm.

The following paper was read by Mr. Gray:

ONIONS FROM SETS.

By J. S. Gray, Minneapolis.

The onion, ranking as it does next in importance to the potato as a market vegetable by reason of its value as a muscle producer, is destined in the future as in the past to be a staple article of food so long as men earn their living by honest toil. This fact, coupled with the records of this Society for several years showing the same persons to have received the award at your summer meeting on onions, induces us at this time to state to you in a few words the exact manner of the cultivation of set onions. We are not going to say to you just what quality of soil you must have, just what depth it must be, or any of a number of conditions that are often enumerated for the purpose of making a simple operation complex and scaring off timid cultivators.

Land should be manured in the fall at the rate of seventy-five tons of cow manure to the acre. Now the feed of the cows from which we obtain the manure is largely nitrogenous, being bran, shorts and ground cockle from the flour mills. In growing a crop requiring so much nitrogen as does the onion the manure from the cows fed as above stated has always given good results. We prefer to plow in the fall if convenient; if not, as soon as possible in the spring. In spreading the manure should be well broken up. We sometimes do this with a harrow and roller, going over several times if necessary, so that when plowed and harrowed the manure will be in fine particles and well mixed up with the soil, which, you will readily see, is in fine condition for furnishing plant food to the crop just as soon as rootlets are formed. The land being plowed, harrowed and planked down, we mark with a twelve inch marker and stick the sets three inches apart and down a little beneath the surface. After planting we tread the rows with our feet, heel to toe, right on top of the sets; the pressure firms the sets and breaks up any little clods of soil that otherwise might in a dry time cause a drying out at the roots. The planting being done, in a few days we take a steel rake and rake lightly over the whole patch, which can easily be done without disturbing any of the sets if the work thus far has been done as before advised. This raking makes an even, mellow surface and destroys all surface sprouting

weeds, which in onion culture is of the greatest importance. When the sets have become well rooted we apply a top-dressing of dry wood ashes or of wood ashes and bones, the ashes and bones having been previously packed in barrels and sufficiently moistened with water to reduce the bones to small particles as fine as if ground. The rains will leach the ashes and set loose such an amount of plant food from the manure that the crop will now be seen to grow exceedingly rapid. Wheel-hoeing and weeding will now be in order until such time as the crop is large enough to market. The pulling, cleaning, tying and marketing will cost five cents per dozen bunches, and we are satisfied that with every convenience for doing this work it can not be done for less. The sets will cost at $5.50 per bushel, ten bushels per acre, $55.

We have been asked a great many times as to what varieties to plant. The market gardener must raise such varieties as his market demands. The Minneapolis market demands a white onion, therefore we grow almost exclusively the White Portugal with a small quantity of Yellow Strasburg, to come in a few days earlier.

The sets which we prefer to all others are those grown on the Landreth Jersey farm. The soil there is poor and light manured, if we may call it manure, with Philadelphia coal ashes. The ashes, we presume, are used more for their chemical effect than as a manure. The Cincinnati sets we consider the next best. The sets grown here do fairly well but the Landreth sets invariably produce fewer seed stems and the finest bulb. By the seventeenth of July the crop is generally all marketed. If there should be any probability of not selling the whole crop in the green state we go between the rows with a cultivator and throw a little soil up into the bulbs. This is done as a protection from the hot sun, and if not done the bulbs would quite likely turn green and their market value be very much reduced.

The onion crop being now cleared off the ground is plowed and prepared for a second crop, which may consist of celery, celeriac, thyme, sage, winter radishes and white turnips. Sometimes we have raised an excellent crop of early horn carrots.

Mr. Terry. I find that sage is the most profitable crop of anything I have grown. I have no trouble in selling it at seventy-five cents a pound. That is for the pure leaf, with none of the stalk in it. I have had some experience with onion sets and with strawberries, but they don't compare with sage raising.

Attention was called to the letter of greeting from Mr. Bushnell, president of the State Agricultural Society. (See page 107).

On motion of Mr. Grimes the compliments of the Society were returned by a unanimous vote.

President Elliot said the relations existing between the two societies had been very harmonious in the past and he hoped would still remain so in the future. He hoped Mr. Bushnell would be able to be present before the close of the meeting.

Mr. Underwood, from the Committee on the President's Annual Address, presented the following report:

The Committee on President's Address recommend that President Elliot, Col. Stevens and Mr. Hillman be a committee to secure a room for holding our annual meetings and a place for our library. Also, that a committee of five be appointed by the president to revise premium list of divisions G, H and I for our next state fair, and to secure representation on the state agricultural board, and that the second, third and fourth recommendations of the President on this subject be included in the duties of that committee. Your committee would also recommend that this Society indorse the work done by our state farmers institute and recommend that the state legislature appropriate $10,000 per annum for its maintenance. We would also urge that our representative in the board of directors should see that horticultural interests be fully and ably represented in the work.

Your committee would further recommend that the matter of local societies be referred to our executive committee.

In the matter of representative at the American Pomological Society in Ocala, Fla., we would recommend that if the finances of our Society will admit, that our President be instructed to attend or secure a substitute.

J. M. UNDERWOOD,
M. PEARSE,
J. S. HARRIS,
Committee.

The report of the committee was adopted.

Mr. Underwood, from the Committee on Revision of Fruit List, presented a report which with some slight changes was adopted as follows:

REVISED FRUIT LIST.

APPLES.

For general cultivation — Duchess, Hibernal, Autumn Streak.

RUSSIAN VARIETIES.

For trial — White Russet, Garden, Lieby, General Greig, Red Anis, Yellow Anis, Antonovka, Titovka.

SEEDLINGS.

For trial — Okabena, Peerless, Victor, Unknown, McMahon, Duchess No. 3.

HYBRIDS.

For general cultivation — Whitney, Beech's Sweet, Early Strawberry, Orange, Martha, Transcendent, Florence, Powers, Sweet Russet.

For trial — Dartt, Greenwood, Tonka, Euranda.

GRAPES.

Moore's Early, Concord, Delaware, Worden, Brighton, Wilder, Janesville.

For trial — Niagara, Woodruff Red, Early Victor, Bachus, Wyoming Red.

STRAWBERRIES.

For general cultivation — Crescent, Sharpless, Windsor Chief.

For trial — Jessie, Kramer's No. 2, Martha, Bubach, Jewell.

RASPBERRIES.

Blackcaps; for general planting — Ohio, Souhegan, Doolittle, Gregg.

Reds — Cuthbert, Turner, Brandywine, Marlboro, Shaffer.

Yellow, for trial — Caroline.

BLACKBERRIES.

Ancient Briton, Snyder, Stone's Hardy.

DEWBERRIES.

For Trial— Windom, Lucretia.

CURRANTS.

Red— Red Dutch, Victoria, Round Bunch Holland, Stewart.
White— White Grape.

GOOSEBERRIES.

Downing, Houghton Seedling.

NATIVE PLUMS.

De Soto, Weaver, Forest Garden, Rollingstone.
For Trial— Cheney, Rockford, Speer, Hawkeye.

Pending the adoption of the foregoing report, some discussion arose, and, on motion, each class of varieties was considered separately.

Mr. Wilcox moved to add Shaffer's Colossal to the list of raspberries.

Mr. Cutler said there were some objections to it on account of small berries, but those he had seen might not have been true to name.

Mr. Reeves thought Shaffer was of great value while Marlboro was worthless.

Mr. Harris said Marlboro had not been a paying berry with him.

Mr. Wilcox. Marlboro is one of these particular things which have never succeeded outside of the hands of its originator.

Mr. Stubbs. I have found Marlboro the most profitable berry I have ever raised. It has been very prolific. My neighbors had Shaffer and it was a good bearer but of poor color for market purposes.

Prof. Green. It is grown at the station and I know the history of Marlboro. While an excellent red raspberry it extends over too great a period in ripening its crop. It is nearly as early as Turner and continues until after the season of Cuthbert. Shaffer in New England, where I have known it, was diseased and the fruit did not keep well. It is worthy of trial. Marlboro is growing in favor in Ohio and should be recommended.

After the final adoption of the foregoing list, on motion, the meeting adjourned till seven o'clock P. M.

EVENING SESSION.

WEDNESDAY, JAN. 16, 1889.

The meeting was called to order by President Elliot.

President Elliot. We have with us a representative of the Dominion of Canada who has come a distance of several hundred miles to attend this meeting, and we should be glad to hear a few words from him. I take pleasure in introducing to you Mr. Thos. Frankland.

REMARKS OF MR. FRANKLAND.

Mr. President, Ladies and Gentlemen:

I cannot say that I feel very much of a stranger among you. Some thirty years ago, down in the state of Ohio, I was stopping at a hotel there and a gentleman addressed me with the words, "I perceive you are a foreigner." My perceptions were quick enough to see that I was. But I feel that my welcome here tonight by the Horticultural Society very plainly indicates that imaginary boundary lines can't separate sympathizing, kindred hearts.

Manitoba; I think you haven't done full justice to it in the reports. Perhaps you are not aware that you had Manitoba air. Some of the gentlemen, I notice, mention the "blasting effects of the cold north wind," which they have been kind enough to call the wind "from Manitoba." (Laughter.) Well, if you have the benefit of the Manitoba breeze in winter, perhaps we have been quite as much annoyed in summer when we have had

one of those searching, scorching winds coming from the south and west, and when we have thought that some of your winds were cooking and drying up our leaves and the wind was fairly tearing up our vegetables out of the earth, we may have felt very much like returning the compliment.

As perhaps many of you are aware, Manitoba is to a certain extent, so far as the cultivated fruits are concerned, a fruitless country. We have the wild plum; we have the raspberry; and in speaking of this I am reminded that Prof. Saunders, of Ottawa, was up to my place this last autumn and picked some raspberries from a cane that was growing in the edge of my garden, and said he thought I was wasting my time in trying to cultivate tame varieties when I could grow such excellent wild ones right out in the woods. Unfortunately, however, those wild ones don't bear as well as we want them to, hence we have to plant the Turner and the Philadelphia—although I believe you have ruled that variety out, and perhaps I had better not say anything about that—and the Cuthbert and some others; and I have been trying them on a small scale.

Strawberries have been a partial failure, but have only been tried to a limited extent. They have planted a few in gardens in Winnipeg, but the soil there and all about Winnipeg is of a nature that if you happen to get off the sidewalk on a street that has not been well taken care of in very muddy weather, unless your boots stick very well to your feet you will be apt to lose something in that sticky mud that prevails at such times in Winnipeg. I think practical fruit growers look upon that heavy soil as being unsuitable for growing fruit until there has been thorough drainage. However, all the soil of Manitoba isn't like that. In the part of the country where I live, some twenty miles north of Winnipeg, we have a sandy loam upon a limestone foundation. Located eighteen miles southwest of Lake Winnipeg and eighteen miles southeast of Lake Manitoba, we think we are favorably situated upon a sort of water-shed, which has considerable influence so far as regards the growing of fruits.

In addressing you I speak feelingly, for the reason that although separated by international boundary lines, I feel the right hand of fellowship has been extended by honorable members of your Society in helping to introduce fruits into Manitoba more than by my own country people.

I heard something said here this morning about the mulberries which reminded me of a conversation with the premier on

last Monday morning. I was asking him if the Mennonites in Southern Manitoba had imported any fruits from Russia. He said he was not aware of anything they had brought with them except the mulberry which he had known to succeed well there for the past five or six years. The honorable gentleman promised me that on the first opportunity he would make arrangements whereby I should receive some of those particular mulberries. If it succeeds in Manitoba, as I find by the reports of your Society it kills down (I have been a member for the past three years), if these Russians of Manitoba shall succeed with it, I shall be most happy to repay some of the courtesies that have been extended to me by members of your Society.

In regard to apples, that is a vexed question. I am not a seedling man or a Russian. I believe Russian fruits will grow in Manitoba, although you may regard me as a little "cranky" in this particular. After being in correspondence with some of the growers of Russian fruits for the past three years, I claim we have a more equable atmosphere than you have here. (Laughter.) Perhaps that may not go down very well; but I suppose the mercury will freeze if it goes to 40° below zero. We cannot tell how much further it goes down. While at times the temperature goes down to that point, I am reminded of a little slap as to that fact. I am not going to expose any gentleman here, but he will forgive me; he knows he is guilty in the matter. But, sir, I saw a report of the temperature in Southern Minnesota, where it was 42° below, while at Winnipeg, at the same hour, the glass showed only 38°. That may be accounted for by certain modifying influences, and it is altogether likely the next time we examined the mercury was frozen at Winnipeg and it was only 40° below in Southern Minnesota.

I have some forty or fifty varieties of the Russians, some of which come from Prof. Budd. You may think I am a crank in supposing I can grow apples there, but I am going to make the venture.

By the kindness of some of your members I have thirty or forty kinds of plums. I have also tried several varieties of cherries. (Laughter.) Don't laugh; I have got two pears! They came out the cleanest of anything and after our last winter's severe freezing they started from the terminal bud. They stood some ten feet to the north of my dwelling which may have had a good effect in protecting them from the south sun, and I am hopeful they may soon come into bearing.

Before I sit down I have a request to make, as I am always on the beg—the most inveterate beggar in this particular, as Messrs. Sias, Dartt and Peffer can testify, if you want an affidavit to this effect. However, I was going to say I have a request to make; if the exhibitors would kindly—in the interest of horticulture—give me a few samples of the very beautiful specimens of apples exhibited that have been raised in Minnesota, the first time I get to parliament I will certainly move on the floor of the house to have them properly rewarded as honorable members of the Minnesota Horticultural Society. (Applause.)

President Elliot. I presume you are looking for seeds?

Mr. Frankland. That is the idea. I don't care about the apples; you can eat the apples if you will give me the seeds.

The following paper was then read by Mrs. Hays:

SCIENCE IN THE HOUSEHOLD.

By Clara S. Hays, St. Anthony Park.

In this age of rapid advancement and liberal culture, the education of woman should be both broad and practical. If the pen is mighty in her brother's hand it is no less so in hers. If a thorough education is necessary to prepare man for his work it is also necessary for woman. What intellectual giants we would be to-day if the mothers in all the past ages had been as well educated as were the fathers.

Is woman's work so important as to warrant all this preparation? There is none other more important. To her is entrusted the home, the workings of which she must understand even to the most minute details, whether or not she performs the work, or any part of it, with her own hands. If she understands perfectly the needs of the several members of the household, also the means of supplying these wants, and is thorough, regular, punctual and systematic, she is well fitted for her work. Upon her depends in a great measure the physical well being of husband or father and brothers. To her is entrusted the upbuilding of the physical bodies of children. It is an undisputed fact that the activity, vigor and keenness of the mind is almost wholly de-

pendent upon the condition of the body. Nor is the mind more dependent on this than are the morals. It is truly claimed that most intemperance is caused by unsystematic housekeeping and improperly cooked food. Healthful, pure, active, energetic homes insure national prosperity.

Then educate your daughters equally with your sons. If you are able assist them in getting a practical college education, but do not have your daughter take what is termed the "ladies course," nor insist that she drum on the piano, not thinking whether she has any musical talent or not. The time when woman was either merely a drudge or a useless doll-like ornament is now past. Future generations will not be telling what an immense amount of wealth and silver and great number of servants their grandmother had, but rather what noble deeds she performed and what wonderful inventions she made. Truly, as regards woman "one decade of this nineteenth century is worth a century of yonder sterile time."

If upon woman depends to so great an extent our physical, mental, moral, social and national well being, she must have broad, thorough, scientific training. Science is now being applied in every department of work; in agriculture, horticulture, dairying, manufacturing, etc. Why not apply it also in our homes, wherein lie our fondest hopes and which are the foundations upon which we inevitably build our success or our failure, both national and individual. The opportunity to prepare herself for work is now offered to woman, and there are varied occupations from which she may choose; her sphere of usefulness is continually widening, but no woman should consider her education finished until she has mastered the principles underlying homemaking. There is at present no work in which exists a greater demand for teachers than in that of housework and cookery. Not as heretofore to merely teach the wealthy how to cook their fancy and costly dishes, and to prepare their many-course dinners, requiring hours for serving, but to teach the masses, the poor, the families of moderate means, and the well to do, to select their food materials intelligently so that all the elements required by the system are present in nearly the proper proportion, and to cook and prepare them in the best possible manner. Knowledge in cookery undoubtedly means improved health and economy of money.

But, says one, is not this housework and cooking a kind of drudgery requiring no mental effort? There is no work more

worthy of thought, more interesting or that gives greater returns for study. Many subjects connected with cookery have been quite clearly worked out. In making bread, for example, we no longer endeavor to follow mother's method. Improvements have been made in milling, giving us better flour; yeast is differently prepared. Our methods must be adapted to our materials. In bread making many interesting questions present themselves such as: What is the nature of yeast? Are any of the laws governing plant life applicable to yeast? How does the growth of the yeast make the bread light, or porous? What five things are accomplished by the heat in baking? Why use wheat flour? Why not use oat flour, or corn flour for fermented bread? Why make this porous bread, is it any more palatable or digestible? So many interesting questions cause us to lose sight of the little labor necessary for mixing, kneading and baking. There is need of further research and experiment in connection with bread making in our homes, for until recently nearly all investigation of fermentation has been for the furtherance of the making of liquors.

In cooking fruits there is opportunity for and need of much interesting thought. Fresh fruits should be cooked with boiling water. As sugar is rendered no more soluble, palatable, digestible, or nutritious by cooking and is, in the presence of some acids, changed to glucose by heat, and consequently is much less sweet, it should be added only long enough to dissolve nicely, before removing the fruit from the fire. Dried fruit should be washed and then soaked in cold water until no longer wrinkled in appearance, but until it has imbibed sufficient water to give the original rounded form and then cooked slowly in the water in which it was soaked. If cooked rapidly in boiling water without first being soaked, the cells are hardened by the heat and lose the power of imbibing water and the fruit comes to the table unsightly, unpalatable and indigestible.

If we want a nice juicy roast, instead of taking the meat, rubbing well with salt, and putting in a pan containing water, and "basting" frequently while roasting — which process invariably gives a delicious gravy but a very unsavory roast — we have but to find some method of imprisoning the juices. This is very easily done by searing the cut sides on a smoking hot pan, then cooking by placing in an oven hot enough to keep the meat frying and "sputtering," but not hot enough to emit any smoke on opening the door.

So it is in every department of housework; study first how to obtain perfect results; second how to obtain these with the least time and labor possible.

It is very necessary that our food be properly cooked, but it is no less important that we understand what food elements and what proportion of these elements are essential to health. Governments have employed men and furnished the funds to enable them to experiment and determine what foods are best adapted to each class of animals, construct digestion tables, feeding ratios, determine the comparative feeding value of grains, roots, grasses, coarse fodders, etc.; in like manner the conditions best adapted to the growth of plants, fruits and trees of all kinds. Appetite is man's only criterion. Appetite is a poor guide to follow thus blindly. If you sit down to a meal consisting almost entirely of carbonaceous food, appetite does not disclose this error, but causes you to eat twice or thrice the customary amount in vain endeavor to obtain sufficient nitrogenous material. The carbonaceous foods—fats, starch, sugar, etc.—cannot take the place of the nitrates although the nitrates can take the place of the carbonates. But this is not economical, since, for instance, it takes more than three pounds of lean meat to equal one pound of starch as a producer of heat, and the cost of the meat is much the greater per pound. The most common mistake, however, is in serving foods that contain too great a per cent of carbonates. The consumer in order to obtain the necessary five ounces of nitrates, which is the proper daily amount, must eat not twenty ounces of carbonates, which is sufficient, but twice or thrice this amount. This is not only a waste but a positive detriment to the system.

There is a class of people who are starving themselves by eating food that does not contain all the elements required by the system.

They are troubled by indigestion and begin dieting, omitting one kind of food after another, thinking that they can in this way remedy the evil. Less than a year ago I met a gentleman who had followed this plan until his food consisted of a cup of coffee with a little cream, and an almost incredible amount of toast. He ate only two meals a day. The bread he termed "bran bread." It was made of flour and bran, about one measure of bran to five of flour. He said: "After eating all that great plate of toast I become hungry within an hour. I have no strength. I have a very disagreeable feeling in my stomach,

which at times is quite painful. I am afraid that coffee disagrees with me; and I am beginning to fear that I have cancer of the stomach or some such disease." I told him I thought he was starving himself. The coffee furnished no nutriment, the cream and butter were carbonaceous, the bran in the bread indigestible, the flour in bread contained carbonaceous, nitrogenous and mineral elements; but taking the cream, butter and bread, the per cent of nitrogenous food was entirely too small. To remedy this the toast was moistened with milk, and he was induced to eat a small piece of meat or a soft boiled or poached egg, a little fruit, and a small amount of some vegetable at each meal. He no longer had the painful sensations and ate much smaller amounts of food.

This subject of the necessary constituents of food is important, and should be considered in making the bills of fare for each day. The starch, sugar or fats are readily obtained. Nitrogenous foods are supplied by lean meats, milk, eggs, the cereals, peas and beans. It is very important that we have vegetables and fruits on our tables daily. Fruits should be used both cooked and uncooked. There is nothing more healthful or appetizing for breackfast than some perfectly ripe delicious uncooked fruits. Bread, meat, cereals, starch, sugar, peas and beans form too concentrated a diet. The vegetables and fruits give more bulk to our food besides furnishing the various mineral constituents often partially lacking in some other foods.

Most of our knowledge of the chemistry and physics of foods and cookery for the human family has been given by men who have experimented with animals. Our numerous experiment stations are now experimenting with stock, various kinds of field crops, also fruits and vegetables are studied and tested as regards producing them for the market, but these experimenters are almost silent as to their importance and relative values as food for people and the best and most scientific methods of cooking them. The questions which they are solving are of special interest to only certain classes. Nicely adjusted food rations for the dairy cow interest only one class; the preparation of foods for the table involves questions of interest to all classes. Chemists, botanists, and other scientists will cheerfully experiment in this line when there is sufficient demand for such knowledge.

The following paper was read by Mrs. Gregg:

PANTRY STORES.

OR THE PROCESS OF PICKLING, PRESERVING, AND CANNING.

By Mrs. O. C. Gregg, Minneapolis.

Short, spicy, tart and sweet my paper must be, for I am to treat of pickles that are spicy and sour; preserves that are pleasant and sweet, and say it all in five minutes time. May I not claim your indulgent attention.

The time allotted me suggests the propriety of treating my subject in a general way, avoiding all detail, which I shall do. In introducing the subject, I would like to say that the domestic preparation of such pantry stores is, after all, the most satisfactory if well done; for it is in obedience to the old adage, "he must serve himself who would be well served."

1*st*. *Pickling*.—The chief requisite of good pickling is good cider vinegar; if one wishes the acidity of the vinegar softened, more or less sugar added will meet the demand. Another requisite—a porcelain kettle. Many fruits and vegetables only need the vinegar scalded and poured over them; while others need cooking to be tender. This should be done in water, or, in some cases, in vinegar and water. Vinegar should only be brought to the boiling point, then poured on the fruit, as heat weakens it. A little bag of spices put in the middle of the jar of pickles is necessary to give them a fine flavor. Pickles should be kept from the air, well submerged in vinegar and stand in a dry, cool cellar.

2*d*. *Preserves*.—Preserves to be faultless require much care. Pay particular attention to the selection of perfect fruit. Peel peaches, pears, quinces, and apples and throw them into cold water to keep them from turning dark; if convenient steam such fruits; if not, cook but a small quantity at a time, for it is difficult to watch a large quantity and insure success. The old rule is, a pound of sugar to a pound of fruit; but since we have come to use cans, three-quarters of a pound or less is sufficient, since preserves may be less sweet with no risk of fermentation if sealed, and at the same time retain more of the natural flavor. Quinces, pears, citrons, water melon rinds, and many of the smaller fruits, such as cherries and currants, harden if put at first into

syrup made of the full amount of sugar to be used. To prevent this they should be cooked in water or in a *thin* syrup, adding the remains of the sugar to the syrup after the fruit is cooked. In preserving fruits which are likely to become too soft, it is well to strew a part of the sugar over them and let them stand a few hours or over night; by this process the juice is extracted and the fruit hardened. Use loaf or granulated sugar. A good syrup is made by using a half pint of water to a pound of sugar. To clarify it stir in the white of an egg beaten lightly with two tablespoonfuls of water, just before it boils, and as it boils remove the scum with care. Boil till no more scum arises and then add the fruit. Preserves should boil gently to avoid danger of burning and to permit the sugar to penetrate the fruit. Take out each piece with a skimmer or silver spoon and let the syrup remain until it "ropes" or "hairs" from the spoon, when it may be poured over the fruit.

Marmalades, or the different butters, will be smoother and better flavored if the fruit is well cooked and mashed before adding either sugar or cider. It is important to stir constantly with an apple butter stirrer.

In making jellies, as well as preserves and marmalades, use a porcelain kettle, also loaf or granulated sugar, and do not have the fruit overripe. Do not make jelly immediately after a rain — especially currant jelly — if firmness or clearness is desired. Use a wooden or silver spoon to stir and an earthen cup to dip with. Currants and berries should be made up as soon as picked. Do not make over two or three pints at a time, as larger quantities require longer boiling. To extract the juice put fruit in kettle with just water enough to keep them from burning and stir frequently, letting it remain till thoroughly scalded; then strain a little at a time, through a strong coarse flannel or cotton bag, wrung out of hot water. As a rule allow equal measures of juice and sugar. Boil juice rapidly ten minutes from the first moment of boiling; skim, add sugar and boil ten minutes longer. To test jelly, drop a little in a glass of very cold water, and if it immediately falls to the bottom it is done; or, drop in a saucer and set on ice or in a cool place, and if it does not spread, but remains rounded, it is done. In filling the glasses, tip them to one side and let the hot liquor fall first upon the side of the glass; after which it may be filled without danger of breaking. When ready to put away cover with pieces of tissue or writing paper cut to fit, and press closely upon the jelly and put on the lid; or

cover with writing paper, brushed over on the inside with the white of an egg and tie or paste down on the outside.

3d. *Canned Fruits.*—Cleanse cans thoroughly and test to see if any leak or are cracked. Never use defective glass cans, but keep them for storing things in the pantry. The fruit should be carefully selected. Most fruits are in best condition for canning when not fully ripe, and should be canned immediately after picking. Use a half pound of sugar to a pound of fruit. In canning for pies omit the sugar. When ready to can, place the jars in a large pan of warm water on the back of the stove. Make ready the syrup, add the fruit, and by the time it is done the water in the pan will be hot and the cans ready for use. Take the cans out of the water and set them on a hot platter, which will serve the double purpose of preventing their coming in contact with any cold surface and saving any fruit that may be spilled. Fill as full as possible and set them on a folded towel wrung out of hot water. After standing the fruit will have shrunk away a little; fill up with syrup, or, if you have none, boiling water will do, and seal up. Cans should be examined two or three days after filling, and the covers tightened. Keep cans in a cool, dark place.

In domestic cooking, as in everything else, let us remember that nothing comes by chance; for you know Emerson says "shallow men believe in luck; strong men believe in cause and effect." The following table gives the time required for cooking fruits and the quantity of sugar for the various kinds:

	Time for boiling fruit.	Quantity sugar to quart.
Cherries	6 minutes.	6 ounces.
Raspberries	6 minutes.	4 ounces.
Blackberries	6 minutes.	6 ounces.
Strawberries	8 minutes.	8 ounces.
Plums	10 minutes.	10 ounces.
Whortleberries	5 minutes.	8 ounces.
Pieplant	10 minutes.	8 ounces.
Bartlett pears	20 minutes.	6 ounces.
Peaches	8 minutes.	4 ounces.
Pineapples	15 minutes.	6 ounces.
Siberian crabs	25 minutes.	6 ounces.
Ripe currants	6 minutes.	8 ounces.
Wild grapes	10 minutes.	8 ounces.
Tomatoes	20 minutes.	none.
Gooseberries	8 minutes.	8 ounces.
Quinces	15 minutes.	10 ounces.

Prof. Lugger, of the state experiment station, was introduced and proceeded to deliver an interesting lecture upon carnivorous plants, illustrating the same by means of large maps or drawings.

FLESH-CONSUMING PLANTS.

By Prof. Otto Lugger, St. Anthony Park.

Ladies and Gentlemen:

When asked by the President and Secretary of your Society to give a lecture upon some subject of interest to horticulturists, I was greatly puzzled what to select. Having been but a short time in this great and prosperous State of Minnesota, I am as yet unacquainted with the insects and plants which are here injurious or beneficial to your loved pets — the fruit and fruit trees. Recollecting, however, that I occupy a twofold position, that of entomologist and botanist, I thought it well to express this by treating of a subject in which both insects and plants are concerned. Their relationship in this case is, however, not the usual one, so well or rather too well known to you. "The lamb has become the tiger," so to speak, and instead of insects eating plants the action is reversed, and plants eat insects.

A great deal has been written about this subject ever since Darwin started the discussion, and many facts are no doubt familiar to you. Still, as other and more recent observations may be new to most of you, I hope to be able to add my mite in entertaining the Society. The facts here related are mainly based upon those published in Austria by Dr. Kerner.

Quite a number of plants have peculiar arrangements for catching and retaining small animals, and it has been proven that the majority of plants thus equipped utilize them as one source of food. As insects are most frequently caught, such plants have received the popular name insectivorous plants; carnivorous plants is another name used. Better still is the name *flesh-consuming plants*, as the most important function of some of them consists in the assimilation of organic combinations from the animals captured. But, as will be shown, one term would never suffice to cover all the various phenomena taking place in such plants.

About five hundred species of plants are now known which catch and utilize animals as food. In this small number the different methods employed to catch and use them as food is so great, that we have to arrange these plants in several classes.

One class is composed of plants which possess cavities into which animals can enter, but which they can not leave again. (See Figs. 1, 4, 5, 6, 8 and 9). No organs to catch and digest are visible, and the plants are thus separated from the second class, in which movements take place as soon as an animal comes in contact with certain parts of the plant, and which serve the purpose of covering the prey with a digestive fluid. (See Figs. 10, 11, 12, 13.) In a third class we have neither cavities, nor any movements performed, but the leaves and other parts of the plant are covered with a glue to hold the animals for digestion. (See Fig. 14.)

In the first group of the first class we have the plants of the genus *Utricularia* or Bladder-wort (Figs. 1 and 2). The traps (Fig. 2) are formed by little bladders, whose mouth is closed by a valve, which allows an entrance, but not an exit of the prisoner. Bladder-worts are plants without roots, which float under water, high or low, according to the seasons. With approach of winter, and the consequent lack of food, the leaves of these plants form upon the end of the floating stem globular winter buds; the older parts of the plant die, the bladders fill with water, and thus becoming heavy sink the plants to the bottom of the pool or pond. Toward spring the buds grow, separate from the older stems, and ascend to the upper layers of the water, where the animal life is already in full activity. Here they soon expand and produce branches, either uniformly covered with leaves, or only in part with leaves and bladders. The ellipsoidal bladders (Fig. 2) are fastened upon stems; their size varies in the different species from two to five millimetres. They are always pale green, translucent, compressed from the sides, with a strongly arched back and less strongly arched bottom. The opening or mouth, which leads to the interior, is always surrounded with peculiar stiff and pointed bristles; it is edged by lips, of which the lower one is considerably thickened. From the upper lip starts a thin, transparent, slanting valve, looking like a curtain; this valve is quite elastic, and can be readily pushed inward from the outside, so that an animal pressing against it has not the slightest difficulty in entering the interior. But as soon as it has entered, and the pressure against the valve has ceased, it is a prisoner for life, as the valve, closed by its elasticity as by a spring, can not be opened from the inside. Animals caught make many efforts to escape, but in vain; they die in a short time, mostly within twenty-four hours, though a few can endure their captivity as long as from

three to five days. But all must perish by starvation; they decay, and the soluble remains are absorbed by certain sucking organs inside the cavity. These cells are shown in Fig. 2; they clothe the whole inner wall of the bladder or trap. Every four of them are united by a common stem into a cross. The organic substances of the decaying victims are thus absorbed, enter through the stem uniting the four cells into the cell of the inner wall, and from there from cell to cell through the whole plant.

Most captives belong to the crustaceans, and are chiefly recruited from the young and adult specimens of *Cypris*, *Daphnia* and *Cyclops;* small infusoria and worms also enter. Even the larvæ of flies manage to crowd in, and it is a very pleasing sight to see the energy displayed by the larvæ of our mosquitos to be eaten up. The number of the enclosed animals is quite large, and as many as twenty-four crustaceans have been counted in a single bladder.

But what induces these animals to enter the traps? We might conclude that food could be found in this cavity, or that it afforded a shelter against enemies. This latter affords a good explanation, as the entrance to the mouth is so well protected against larger animals, as seen in the illustration (Fig. 2.) Only very small animals are to be admitted; larger ones must be kept away, or they would injure the whole structure. It seems therefore plausible, that the smaller animals, chased by larger ones, are induced by the plant to enter — to escape the frying pan and fall into the fire. Species of *Utricularia* are found in Europe, North and South America. One species, common in Brazil, is found growing in the water collected by the leaves of some plants related to the pine apple. Usually but one specimen of the Bladder-wort is found in each cistern; if the water in that becomes too low, the plant has the wonderful power of growing and directing a branch towards and into the adjoining cistern.

Strange to say, species of *Utricularia* are known, which do not live in water at all, but among mosses. But notwithstanding this very different habitat, they contain bladders quite able to catch food. They grow in large numbers below the surface of the soil, are perfectly transparent, and filled with clear water; their mouths are carefully hidden, and usually roofed over to prevent the soil from filling them.

The second group of the first class, containing carnivorous plants, whose leaves are transformed into pitchers or tubes, prevent the escape of prisoners by means of variously formed spines

upon their inner walls; these spines are always directed downward (Fig. 3). The shape of these traps is very different, and we know some that look like trumpets, tubes, bags, funnels, pitchers, bottles, and urns; others again are straight, bent or spiral. But all start from that part of the stem, which joins the surface of the leaf. This latter is always comparatively small, frequently only forming a scale, or it appears simply as an annex to the large and excavated stem. In some the leaf forms a cover over the mouth of the cavity, as in some species of *Nepenthes* (Figs. 5 and 8); in others it forms a non-political platform, rest-inviting for insects, which are, however, as often caught by it as some bipeds.

In every trap of this kind we can distinguish three things: something to invite insects to come; something to prevent those that have entered the trap from escaping; and something to decompose the dead prisoners, and change them to products that can be absorbed. The invitation given to insects is similar to that given by flowers. Either honey is secreted, or bright colors are displayed, which indicate to flying insects that a table has been spread for them. The escape of a prisoner is made impossible by pointed spines and hairs directed downward, or by other similar arrangements, as shown in Fig. 3. The decomposition of the dead insects is produced by certain liquids, secreted by peculiar cells in the bottom of the cavity.

Although all plants belonging to this group are rather uniformly equipped to fulfill these three conditions, the equipment itself is very different, and many curious things can be seen in these murderous dens, making it worth while to investigate them a little more in detail.

We first mention the genus *Genlisea*, closely allied to the *Utricularia*. About a dozen species are known, which grow in water or in swampy places in tropical Africa, Brazil and the West Indies. Besides leaves formed as usual most of the species of *Genlisea* possess also others transformed into traps. Each trap consists of a narrow, long, cylindrical bag, widened at the closed end, and furnished with a narrow opening at the other. The opening is encircled with very small hooked teeth, bending inwards, and the whole inner wall is clothed with innumberable small bristles, which start from projecting rows of cells, and point downwards [Fig. 3, (1)]. Besides the organs mentioned we find below and between the bristles scattering, wart-like glands, composed of four to eight cells. The base of the bag is without

pointed bristles, and contains only glands arranged in rows. Small worms, mites and other articulates, which enter the mouth, can easily penetrate to the base of the bag, but can not return on account of this army of lances pointing towards them. They are prisoners, die, and the remains of their disintegration are absorbed by the glands inside the bag.

As types for a second series of plants organized in this manner we may mention a plant from British Guiana, the *Heliamphora nutans* and our common Trumpet plant, the *Sarracenia purpurea* (Fig. 4), which is found in swamps from Hudson's Bay to Florida. In both the leaves, transformed into bags, are arranged like a rosette or star, and their bases rest upon the moist soil; from there they bend upwards, are inflated near the middle, contract again near the opening, and end in a rather small leaf. This leaf is striped with red lines, has the form of a shell, and presents its concave side towards the falling rain. In the *Sarracenia* this arrangement serves the purpose of collecting and conducting the rain into the bags, which are more or less filled with water, and from where it can not readily evaporate. The spike-like bristles which clothe the inside of the bag of *Heliamphora* are arranged like the scales upon the back of a pike [Fig. 3 (2)]; they point downwards and grow longer and more pointed towards the base of the bag. The shell-shaped leaf in *Heliamphora* above the opening bears glandular hairs, which secrete honey, so that the lips of the mouth are covered with a thin film of this attractive material. Numerous small insects are thus attracted, both winged and unwinged ones; the latter utilize a peculiar projection upon the concave side of the bag to reach the honey. If they enter they are lost, as they can not crawl over the slippery scales, armed with spikes, and eventually perish in the water collected below. The remains of their decaying bodies are absorbed by cells in the inner walls. The number of corpses is frequently so great that the plants can be discovered by the unpleasant odor arising from them. Some birds, gaining knowledge from experience, frequent such plants to pick dead insects from the bags.

Whether the fluid contained in these traps is simply water, or whether the gland-like cells occurring, for instance, in the leaf of the Trumpet plant, secrete other fluids, is doubtful. A centipede, about four centimetres long, which had during the night entered the trumpet of a *Sarracenia purpurea*, would indicate the presence of another fluid than water. One half of the centipede

was above the water, the other beneath; the immersed part had changed to a white color, and showed changes not seen in specimens simply immersed for the same length of time in rain water.

Very different from the trumpets of *Sarracenia purpurea* (Fig. 4) are those of *Sarracenia variolaris* [Fig. 5 (1)], which grow in the swamps of Alabama, Carolina and Florida, and those of *Darlingtonia californica* [Fig. 5 (2)], which grow in similar localities in Oregon and California. In both the acid fluid within is produced by cells in the cavity, and it is impossible that a single drop of rain could reach the interior. This tubular cavity in both widens but little toward the opening, and is covered by the under surface of the leaf, which projects as a hood or roof over it [Fig. 5 (1)]. The mouth or entrance is therefore hidden, and forms a slit or hole beneath the roof. The lower part of the trumpet is uniformly green, but the upper part, and chiefly the roof, is veined with red and carmine; the spaces between the veins are thin, transparent, pale green or white, and produce the effect of small windows in red or green frames. This impression is heightened by looking through the mouth against the light. All these various bright colors give the leaves the appearance of flowers.

No doubt insects are deceived by these colors, and fly to the traps, which, moreover, really secrete honey at their mouth and inside the roof, thus inducing them to enter. *Sarracenia variolaris* further invites wingless insects, chiefly ants, by having upon it a flange forming a highway from the soil to the trap, with glands to secrete honey as well [see Fig. 5 (1.)]. This highway leads to a sure death; following the honeyed invitation, insects soon reach the mouth, where more honey is stored for the poor victims. Once inside, they are certainly forced to the bottom, as the whole interior wall is covered with bristles pointing downward (Fig. 3). Winged insects, which have entered the mouth, try to save themselves by flying, but they never find the darkened entrance, and mistaking the windows for real openings, they fly against them until exhausted. As soon as the victims come in contact with the enclosed fluid, they become stupefied, and die sooner or later. This fluid must not, however, be called a poison, as some insects can live in it for at least two days; it is simply a fluid which accelerates decomposition of the victims. The number of captured insects is quite large, and deposits as thick as fifteen centimetres have been observed. Why the leaves of

the *Darlingtonia* [Fig. 5 (2)] should grow in a spiral direction, it is difficult to say, but it may be to make an escape still more difficult, because if the winged captives try to escape by means of their wings, they will still more certainly come in contact with the walls clothed with bristles, and they will be stunned in a short time. We must here mention that two insects brave all the dangers of the murderous traps of these plants. One is a fly, a common blow-fly (*Sarcophaga Sarraceniæ*), which not alone escapes all dangers, but even utilizes the stored-up food for the raising of its own larvæ. These larvæ thrive in this putrid matter, and leave, when fully grown, by self-made holes in the sides of the trumpets, to transform in the surrounding soil. Prof. C. V. Riley also described a beautiful moth, black and yellow, the *Xanthoptera semicrocea*, which escapes unhurt; its larvæ utilize the green walls of the prison itself for food. Both insects are, however, well adapted to frequent such dangerous places. The fly has peculiar organs upon its feet, composed of very broad soles and long hooks, which latter can be compared with the iron points used by workmen to ascend telegraph poles. The moth possesses similar long spikes upon the legs; its larvæ escape by spinning a carpet of silk upon the inner wall of the trap, and by never moving beyond it.

The fluid contained in the traps is not secreted to digest, otherwise the maggots of the fly (*Sarcophaga*) would also be digested. It is well known, that if living larvæ enter the stomach of carnivorous animals, they are at once killed and digested. Here it is different, and the fluid is simply secreted to accelerate decay, and to form liquid manure, which is absorbed by the plants by cells located upon the inner epidermis in the lower parts of the traps.

Another series of similar plants comprises forms, whose leaf-stalks are symmetrically excavated, with the mouths upwards, and covered by the leaf as a lid. Most frequently these traps have the shape of cans, urns, funnels and pitchers, and the lids are arranged over the mouth in such a manner as to prevent the rain from entering, but not the insects. Several species of *Sarracenia* [Fig. 5 (3)] belong to this series, also the Australian *Cephalotus* (Fig. 6), and the numerous species of the true Pitcher plants (*Nepenthes*) [Fig. 5 (4), 8 and 7 (young)].

We will only consider the two latter genera of plants. *Cephalotus follicularis*, related to the currant bush, grows upon the moors of eastern New Holland. This plant has two forms of

leaves, which grow as a rosette or star around the base of the flower stem. Only the lower leaves are transformed into traps, chiefly to catch wingless insects crawling upon the earth. All the pitcher-like traps rest upon the moist soil, and possess leafy projections, upon which crawling animals can approach the openings or traps. Of course flying insects are not excluded, but are also invited by bright colors to sip honey. The half opened lid, with white spots and bright vermilion red veins, is easily mistaken for a flower. Both winged and unwinged animals and insects, which are lured by the honey to enter the mouth, soon loose their foothold upon the very smooth inner walls, and drop into the fluid, which fills nearly one-half of the cavity. Even if they should not be drowned, the prisoners have to surmount three different kinds of obstacles in their road to liberty. First, a rim projecting inwards; second, a piece of wall densely covered with stiff and sharp bristles pointing downward; third, a row of hook-like teeth near the mouth. The numerous corpses found in such traps clearly show how well adapted this prison is to retain its victims. Ants form the staple of their food. Their dead bodies are not changed, however, into liquid manure, but they are dissolved by a clear acid fluid secreted by glands in the inside of the traps. This process is similar to that taking place in the traps of the true Pitcher plants or *Nepenthes* (Fig. 8). Of this latter species we know about thirty-six species; they are all tropical plants, and all grow in swampy soil near ponds; the young plants have a great resemblance to the *Sarracenia*, as seen in Fig. 7; when mature they look like real lianas growing in the crowns of medium sized trees. The pitchers [Fig. 5, (4)] must be considered as an excavated portion of the leaf-stem, and the piece acting as the lid is the real leaf. Such pitchers vary greatly in size in different species; the largest is *Nepenthes rajah*, which is large enough to snugly shelter a pigeon. The younger pitchers are still closed with their lids; their color varies greatly, from rusty brown, golden, powdered with white, to snow-white, and all are very hairy. When full grown the lid is lifted, the outer covering of hair disappears, and a yellowish-green color prevails, enlivened by vermilion spots and veins, or by other bright colors. The lid is equally brightly colored, and the whole pitcher — or a *leaf* — resembles very closely the *flower* of certain species of *Aristolochia*, and strange to say the genera *Nepenthes* and *Aristolochia* are also closely related.

Insects, and perhaps other flying animals, are attracted to this

flower-like leaf, which produces also considerable honey, so that we may well say: they possess sweet lips and a honey mouth. But the poor animals kiss once too often; entering the interior of the pitcher, whose rim is made so slippery by a bluish coat of wax that the unwary insect is unable to crawl up again, it is drowned in the fluid below. Most captives die at once, others try in vain to save themselves by crawling upwards. Upon the larger pitchers the bulging rim of the mouth is closed with sharp teeth, pointing downwards [Fig. 3 (5)]. In many species these sets of teeth looks like those of carnivorous beasts, and in the species shown in Fig. 5 (4) occurs even a double row of teeth, making an escape an impossibility. The large amount of fluid in these cans will soon drown the victim. This liquid is produced by glands located upon the inner walls, and consists mainly of water, showing but little acidity as long as no animals have been caught. But as soon as a victim has entered and reached the bottom of the pit, more fluid is secreted, which is distinctively of an acid nature, and possesses the property of dissolving albumen, flesh and blood.

This fluid possesses not alone the properties, but also the composition of gastric juice. Besides the organic acids, such as apple acid, citric acid, formic acid, a pepsine-like ferment has been discovered, and organic bodies containing nitrogenous matter have been artificially dissolved in it. If we pour upon a small piece of meat, in a glass vessel, some of the fluid contained in a pitcher, which has, as yet, not caught any food, the meat is but slightly changed; but if a few drops of formic acid are added, then it is dissolved, and the same changes take place in it as if it had entered the stomach of an animal. True digestion, therefore, may be said to take place in the pitchers, and the digested parts of the animal food are absorbed by peculiar cells situated in the bottom and lower parts of the walls.

A third group of carnivorous plants belonging to our first class, consists in plants whose scale-like leaves possess peculiar cavities, into which but very minute animals can enter, as the entrances to them are very small. Arrangements to prevent the animals from escaping are lacking, and the living food is simply arrested and sucked empty by protoplasma-threads protruded from peculiar cells found in the cavities [Fig. 9 (5)]. One of the most peculiar plants of this group is the *Lathræa squamaria* [Fig. 9 (1-5)], a plant without chlorophyll, and a subterranean parasite upon the roots of other plants. The subterranean

whitish stems look fleshy and fat; their whole length is covered by scale-like, overlapping leaves [Fig. 9 (1)]. These pale leaves are broadly heart-shaped and appear to be fastened with their entire base to the stem. Such is, however, not the case, and if we separate a leaf from the stem, we see at once that the apparent base is a part of the upper surface rolled back; in reality, we can distingush the following parts: first, the rather short connection with the stem; next, that part which looks like the entire surface of the leaf, but which is only a part of it, forming a slanting shield sharply edged; the other part, bent at a sharp angle from the shield, might be mistaken for the lower surface, but belongs in reality also to the upper one; next, the free end of the leaf, forming the rolled-up margin. By this rolling up of the margin, a long cavity is formed right under the base of each leaf, as readily seen in the illustrations. In this cavity enter, by means of five to thirteen small holes, about ten apartments, excavated in the thick leaves themselves. They are, at least in this form, an unicum in the whole vegetable kingdom.

To learn how the plant uses these apartments, we must look at them a little closer. They are arranged side by side, but do not connect with each other; all are higher than broad, with irregular wavy walls [Fig. 9 (3)]. Inside these walls we notice two kinds of organs, which are a little elevated over the epidermis, and project into the cavity. One kind is present in large numbers, and is formed by a pair of cells united into a button, borne upon a short cylindrical foot; the others, still more numerous, are formed by large round or elliptical cells. The walls of such cells are rather thick, and the protoplast living inside of one extends, when excited, fine threads through the openings in the wall [Fig. 9, (5)]. If small animals enter these labyrinths, and touch one of these organs, the protoplasma-threads at once surround the intruder. Only very minute animals are thus held; larger ones are only impeded in their further movements, and are made prisoners. No secretion of any kind has been observed. But as we find after a while only the hard substances of the victims, such as claws, parts of legs, etc., in the cavity, whilst flesh and blood have disappeared, we must conclude, that the food derived from the decaying animals must have been absorbed by coming in contact with the threads of protoplasma. It is possible that the higher button-like glands upon stalks may simply hold the food, and that the flat ones absorb it; this would also explain the larger numbers of the former. Other arrangements in the cavity

also point in this direction. As the openings leading to the apartments in the leaves are quite small only minute animals can enter. But what induces them to enter is difficult to say; they may, perhaps, simply enter to escape to them more apparent dangers.

It has been mentioned that *Lathræa* is a parasite. Although such plants will not be discussed as this time we must understand, that the principal food of the plant is obtained by sucking-cells fastened upon the roots of other plants. The *Lathræa* grows only in regions with a long winter, the sucking-cells die during the autumn and are not removed until spring. The food thus obtained is not very different from that obtained by its host, being composed of water with a solution of slight amounts of salts — a fluid we may call "raw food." Since the plant is a subterranean one, lacking chlorophyll, and thus not able to obtain from the air carbon-dioxyd, it is of great importance to it to obtain the necessary nitrogenous substances from dead animals. The supply from its victims, although small, is not so insignificant, because it can be obtained summer and winter, since at the depth in which these plants grow, infusoria and other animals are always active and consequently accessible.

If it is strange, that a subterranean vegetable parasite without chlorophyll can absorb both the raw food from its host, and also self-caught animal food, it is still more strange to find plants, which are enabled to obtain additional food directly from the soil. Such a plant is *Bartsia alpina* [Fig. 9, (6–8)]. As it would take too long to mention the details of the traps, sections of them are simply illustrated; upon one side of the canals there shown similar glands may be seen as were found in the apartments of the *Lathræa*, and we can not doubt, that the whole arrangement is used to catch infusoria.

CARNIVOROUS PLANTS WHICH PERFORM MOVEMENTS IN CATCHING FOOD.

The *Lathæra* and *Bartsia* have been mentioned as belonging to the first class of carnivorous plants, which perform no movements to catch and digest the animal food caught by them. But both species form the connecting link between those plants which perform movements of the organs used to catch and digest as soon as these come in contact with the bodies of animals. These various movements depend upon the manner in which the

food is digested. In *Lathræa* and *Bartsia* it is only the protoplasma of the button-like cells in the interior of the cavities, which sends out mobile threads to hold the prey. Of course other plants may be yet detected, that will upset all our artificial classifications, which do not occur in nature, but are simply made to enable us to study more systematically.

The first group of carnivorous plants which perform movements for catching living food, is composed of the species of *Pinguicula*, of which about forty are known, and which resemble each other so closely, that no one except a botanist could at sight distinguish between *Pinguicula calyptrata* from the mountains of New Granada and the *P. vulgaris* growing in the Hartz mountains. The localities in which these plants grow are also quite similar. Both in the old and new world they grow in moist places, upon the margins of creeks, upon moors and in swamps. Farther south they exchange the cool regions for higher altitudes. Very rich in species are the high mountains of Mexico. Each species in a southern region is quite local, whilst those growing in the arctic and subarctic regions have a very wide distribution. The best known species is *P. vulgaris*, extending from North America, north of Mackenzie, to Labrabor, Greenland, Island to Siberia, and from the Baikal mountains through Europe to the Balkan, Alps and Pyrenees.

The delicate looking plant possesses violet-blue flowers, borne by slender stems, starting from a star of leaves resting upon the soil. The leaves are elongated-oval or tongue-shaped, and of a yellowish-green color; their edges are turned up, transforming each leaf into a broad channel or groove, with a flat bottom [Fig. 9 (9-11)]. This groove is covered with a sticky, colorless slime, secreted by numerous glands upon the upper surface of the leaf. There are two kinds of glands; one looking like a button upon a stem, can be seen with the naked eye, and resembles a small mushroom [Fig. 9 (9)], and is composed of eight to sixteen radiating cells supported by a single tubular one as a stem. The second kind of gland is composed of eight cells, grouped together in a wart-like body, projecting but a little above the surface of the leaf. One square centimetre of a leaf contains about 25,000 slime-secreting glands, so that the whole plant, usually composed of nine leaves, carries about half a million of such glands. If these glands are simply touched for a short time, perhaps by drops of rain, no change is produced, but a continuous pressure by any solid substance, for instance by in-

soluable grains of sand, excites the glands to secrete more slime, but by no means forces them to secrete an acid fluid. But as soon as organic substances containing nitrogenous matter come in lasting contact, not alone slime, but also an acid fluid is secreted, which is able to digest flesh, milk, the white of an egg, even softer bones. Experiments have proven that small pieces of this latter material have been almost entirely dissolved in about forty-eight hours; after eighty-two hours they were in a fluid condition; the whole secretion was then re-absorbed, and the glands had become dry again. Small insects landing upon such a leaf are glued to it, and are digested, leaving only their hardest parts undissolved behind. The acid fluid is thick, and can be secreted in quantities large enough to fill the whole groove. If an insect should be caught near the margin of the leaf, the latter is able to bend and roll up, thus pushing the victim more towards the middle of the leaf, where it comes in contact with more secretions. This rolling up is done very slowly, and it takes several hours before the insect caught is pushed to the middle of the groove. After dissolution and absorption of the food the leaf gradually assumes its former position. Small parts of plants, such as pollen carried by the air, are treated in the same way as small animals.

The effect of the acid fluid upon bodies containing albumen is identical with that produced by the gastric juice of an animal, and we can conclude that this vegetal secretion contains, also, besides a free acid, a ferment like pepsine. Since everything soluble is absorbed by the leaf of *Pinguicula*, we need not hesitate to state that this process is true digestion. Whether the two kinds of glands perform different work is difficult to say, but very likely a division of labor takes place. The similarity between this leaf and the stomach of an animal was long known, even before an explanation was offered by botanists. It was not alone long known, but also practically employed, that these leaves had—like the stomach of calves—the property of producing certain changes in milk. If fresh milk, still warm, is poured over such leaves, it is transformed into a treacle-like substance, the Tätmiölk or Sätmiölk of the Laplanders, a favorite dish of the people in northern Skandinavia, already mentioned by Linnæus one hundred and fifty years ago. It is, moreover, very peculiar that a small quantity of this Tätmiölk will again change large quantities of fresh milk into that substance, proving that the substance obtained from the leaves of *Pinguicula* acts as other ferments.

This rolling inwards or backwards of the margin is slow, and consequently not easily perceived. But we have other plants, which act more rapidly, forming the second group of the carnivorous plants under consideration.

Best known are the species of Sundew or *Drosera* (Fig. 10), which grow upon a similar soil as the *Pinguicula*, and frequently side by side. About forty species of Sundew are known; all are recognizable by the soft, reddish and club-shaped tentacles of their leaves, usually glistening with a drop of moisture. These tentacles start from the upper surface of the leaf, the lower one being smooth, usually resting upon the surface of the soil. All the leaves of this little plant surround the base of the flower-stem, and this similarity of growth with other insectivorous plants, such as *Pinguicula*, *Sarracenia*, *Heliamphora*, *Cephalotus*, *Dionæa*, etc., is very peculiar. A leaf of the Sundew looks like an oval cushion with pins stuck into it. The tentacles are of unequal length, those standing erect in the middle are shortest, largest those near the margin (Fig. 10). About two hundred tentacles are found upon each leaf, and their knob-like ends are glands. Each gland secretes a clear and sticky fluid, which glistens in the sun like a drop of dew, giving the popular name "Sundew" to the plants. Vibrations by wind or rain do not produce any change of position in these tentacles; if we purposely put pieces of soil, grains of sand, glass, coal, gum, sugar, starch, tea, or other substances free of nitrogenous matter upon the leaf, more fluid is secreted, which also becomes acid, but no secretion of pepsine takes place, nor any change in the direction of the tentacles. But as soon as a small insect, mistaking the glistening pearl for a drop of honey or water, settles upon the leaf and thus touches the glands, or if we purposely drop upon it bits of meat, or the white of an egg, a liberal secretion of acid and pepsine takes place at once. The insect, glued to the plant, is soon covered with the secretion, and dies by suffocation as soon as its stigmata are closed with it. We see that both *Pinguicula* and *Drosera* act exactly alike, but the latter plant is distinguished by the movements which the tentacles perform. These are best seen near the margin of the leaf. Soon after an insect has touched some of the tentacles they become excited. The first tentacle coming in contact with the insect bends inwards, making a movement like the hands of a clock; it moves in two to three minutes through an arc of 45°, in ten minutes of 90°. About ten minutes later the neighboring tentacles move like-

wise, and so forth until all the tentacles cover the victim. It is not always the middle of the leaf upon which the tentacles meet. Frequently, if two insects have lodged upon the same leaf, the two hundred tentacles form into two groups, each trying to cover one of the captured insects. If the insect is large even the margins of a leaf curve over the food, and thus the surface of the leaf resembles a hollow hand filled with a large amount of digestive fluid.

These movements vary for every case, but they are always adapted to be of the greatest benefit to the plant, and always succeed in covering the victim with a secretion to dissolve and absorb it. If an insect should be glued to one of the tentacles near the margin, not enough of the secretion could reach it, and therefore the tentacle bends inward to bring it in contact with the other glands, and it is soon digested. According to the size of the insect captured, it takes from two to three days to digest it; if completed, the original position is resumed, the secretion is all withdrawn, and the remaining dry parts of the insects are carried away by the wind. The leaf is now ready to catch more victims. Little flies form the staple food for these plants, but other insects, if not too large, are also captured. Even dragon flies have been caught, but in this case three neighboring leaves acted in unison.

How important the movement of these tentacles are, not alone for the plant but for botanical and other sciences, can be imagined if we remember that this movement did not alone take place in the excited cell, but that this excitement was communicated to the second, third, tenth and one hundredth protoplast, and that the rate at which the excitement traveled can be measured. (By protoplast we understand the individual protoplasm inhabiting a single cell). The movements, moreover, are always directed to carry out a certain work, a work to the best of the whole community of protoplasts, and such movements must be considered as at least instinctive ones.

Investigations have given the following results: a piece of a woman's hair two-tenths of a millimetre in length, and weighing .000822 milligrams, laid upon a tentacle of the *Drosera*, produced a slight movement, a bending of the excited gland. Such a minute body laid upon the tongue of a human being is not recognized at all, and the protoplast in the gland of this plant is consequently more sensitive than the nerve endings in our tongue, which is considered our most sensitive organ. One four-thousandth part of a

milligram of carbonate of ammonia, and one 30,000 milligram of phosphate of ammonia were sufficient to produce a motion. All the experiments showed that fluid substances excited more than solid ones, and that bending of the tentacles took place more or less rapidly, in the same proportion, as the substance laid upon them contained more or less nutriment for the plant.

The communication of an excitement through the protoplasts in a community as that of a plant of Sundew can be compared with the transmission of an excitement by the nerves towards the brain, or with the transmission of a will to the muscles. The transmission is a progressive movement in the smallest parts of nerves, similar to that of sound, of light, of electricity; but it has never been possible to make such transmission visible. Therefore it is so much more interesting to observe, with unaided eyes, the material changes which occur in the excited protoplasm of the Sundew, and in the protoplast transmitting this excitement.

In each cell we can see the protoplast, forming a thick layer close to the wall, and in a contant flowing motion. It contains in its interior an uniformly colored purple fluid. If a small piece of meat is laid upon such a cell, the content of that cell is at once excited, and the uniformly colored purple fluid is dissolved and transformed into dark, round, club-shaped or worm-like pieces, into cloud-shaped balls, and into an almost colorless fluid. This change spreads from the excited gland downward, from cell to cell, through the tentacle, and so forth in all direction and at the same time with these visible signs of a transmission all those tentacles bend in which the purple-colored fluid underwent a change as just described. If the piece of meat is dissolved and digested, or if the tentacles regain their former position, we see the dark pieces or ball disappearing into the body of the protoplast, and the uniform purple color, found privious to an excitement, is restored in their place.

The species of Sundew in the family *Droseraceæ* occur over the whole world. Others of this family belong to the genera *Dionæa*, *Aldrovandia*, *Byblis*, *Roridula* and *Drosophyllum*. Each of these genera contains but one or two species, and each species is very local. But all — like the Sundew — catch insects, and possess the property of dissolving and digesting them. The most peculiar species are, however, *Dionæa* and *Aldrovandia*, which form our third group of carnivorous plants of this class. Their organs for digesting and catching are the most peculiar ones in the vegetable kingdom.

The Venus fly-trap (*Dionœa muscipula*) grows in a very limited region in eastern United States, usually near swamps (Fig. 11). Its leaves are also arranged in the form of a rosette around the base of the flower stem, and lie more or less flat upon the surface of the soil. Each leaf [Fig. 12 (1)] is composed of a spatula-shaped flat stem, which in front is suddenly contracted to almost nothing, and thence expands again into a round leaf. This latter is divided by a rib into two equal halves, which have the position to each other as the leaves of a half open book. The margin of each leaf carries twelve to twenty long and pointed teeth, which possess, however, neither glands nor other remarkable organs. In the central space of each half are three very stiff and pointed spines, which are always shorter than the marginal teeth, and which do not point straight upward. These spines are composed of elongated cells [Fig. 12 (3)], whose protoplasm is in a constant and rather rapid motion. At the base of these spines we find a very short cylindrical bolster composed of small cells, which allow a bending of the spines. The individual spines are rather stiff, and can not bend, but can be pressed upon the surface of the leaf, the bolster forming a sort of joint. Besides the bristles we find the whole surface covered with glands [Fig. 12 (6)], each composed of twenty-eight small cells; they have a carmine color and can secrete a slimy fluid. Pressure, the shaking of the entire plant or of a leaf by winds or falling drops of rain, even injuries upon the stems or upon the under side of the leaf produce no visible changes, but as soon as the upper surface is touched, then the halves of the leaf approach each other, until the pointed teeth of their margins cross, and the insect producing this sensation is held a prisoner [Fig. 12 (2)]. If the insect only touched the glands this folding together is carried out quite slowly, but if one of the six spines has been touched ever so slightly, the folding takes place at once, in ten to thirty seconds, and may be aptly compared with the sudden closing of an open book. The marginal teeth interlace like the fingers of our two hands; the formerly flat upper surfaces of the leaf are made a little concave, so that they inclose a hollow space.

The now following changes depend upon the duration of the excitement, and whether the enclosed substance contains food or not. If the excitement is of a short duration, or if the captive is not suitable for food, the leaf soon assumes its normal position. Otherwise the halves press tightly together; all the glands, dry before, secrete now a slimy, colorless, very acid fluid,

even those not in actual contact with the prisoner. This fluid is quite abundant, looking like drops, if the closed halves are forcibly separated. It surrounds the enclosed object and soon dissolves the same. If finished, the secretion is absorbed, and with it the digested food; the glands become dry, and the halves of the leaf open again for another victim. Of the caught object everything that could be consumed has disappeared. The six bristles, which in the closed cavity were bent like the blades of a knife, again assume their former position.

The length of time needed for digestion varies according to the size of the victim. Usually the halves remain closed from eight to fourteen, even twenty days. Larger articulates, such as centipedes, can escape, if their whole body is not enclosed, by mere strength, since the margins and teeth of the halves are somewhat flexible; smaller animals are always lost, and they soon suffocate in the fluid covering them.

The whole trap, although similar to that of the Sundew, is quite an improvement of it, and the division of labor is much more pronounced, as the six spikes are not used both as organs of sensation and digestion, but only for the former purpose. The outer long and pointed teeth are also free from glands, and simply serve to enclose the victims more securely. We have therefore in the traps of the *Dionæa* organs for three distinct functions: to excite, to catch and to digest, whilst in the *Drosera* the same functions are performed by organs of one kind. The transmission of an excitement is also much more rapid in our Venus fly-trap.

We have already compared this transmission with the similar one in the organism of animals. But strange to say even electrical currents have been observed in the Venus fly-trap, which prove that it has the greatest analogy with muscles and nerves even in this respect. A current of positive electricity flows from the base to the extreme end of the trap, another negative one can be observed in the leaf stem, and as seat of the source of this electricity the upper layers of cells of the surface of the trap and the middle rib have been ascertained. Every excitement of the leaf changes at once the intensity of the electric current, and as this change produces a movement of the halves comprising the trap we may assume that the electric current regulates the opening and closing of the whole trap.

The allied *Aldrovandia* (Fig. 13)—allied as far as the structure of the trap is concerned—is an aquatic plant, found in

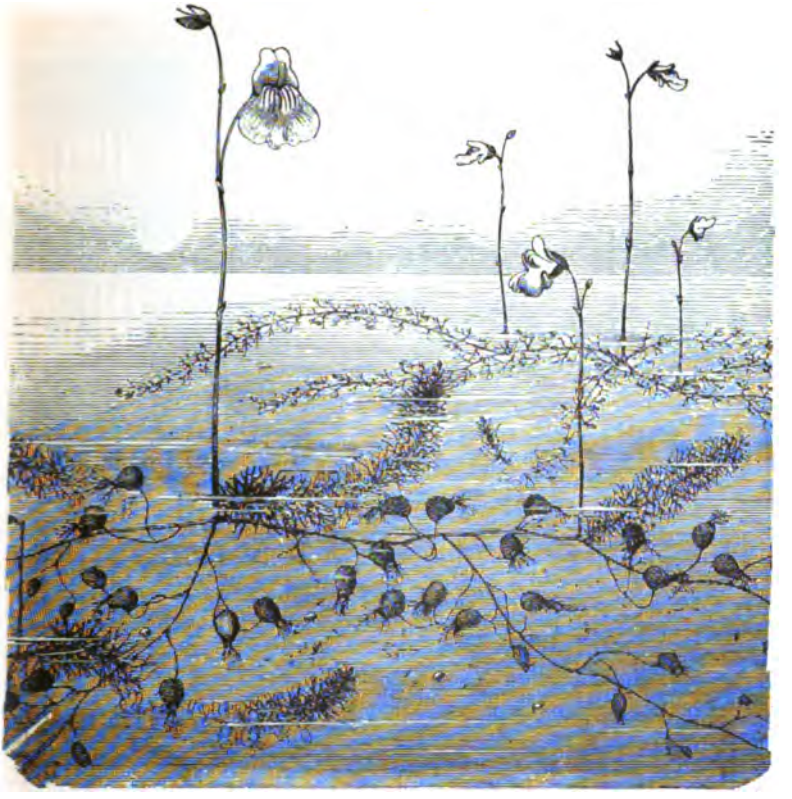


Fig. 1. Bladderwort (Utricularia spec.)

Fig. 2. Traps of Utricularia: 1. Trap enlarged 4 times. 2. Section through trap. 3. Sucking-cells upon the interior walls, enlarged 250 times.

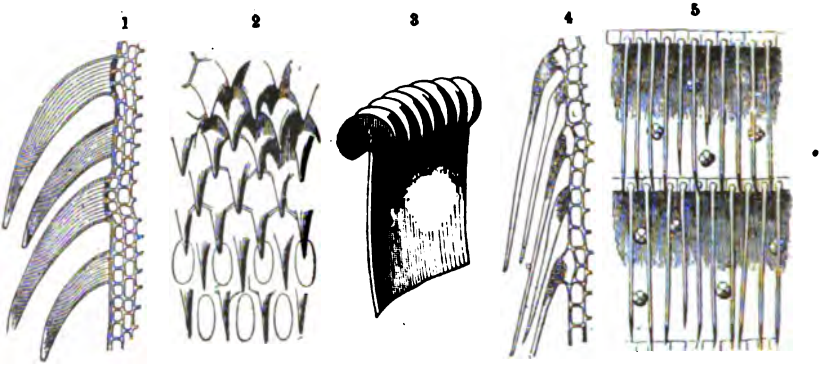


Fig. 3. Spines, etc., in traps: 1. *Genlisea;* inside of a piece of tube. 2. *Heliamphora;* spines upon interior walls of trap. 3. *Sarracenia purpurea;* a piece of the mouth of trap. 4. *Sarracenia purpurea;* section through inside wall of lower part of trap. 5. *Nepenthes;* spines of interior wall near mouth of trap. Greatly enlarged.

Fig. 4. *Sarracenia purpurea.*

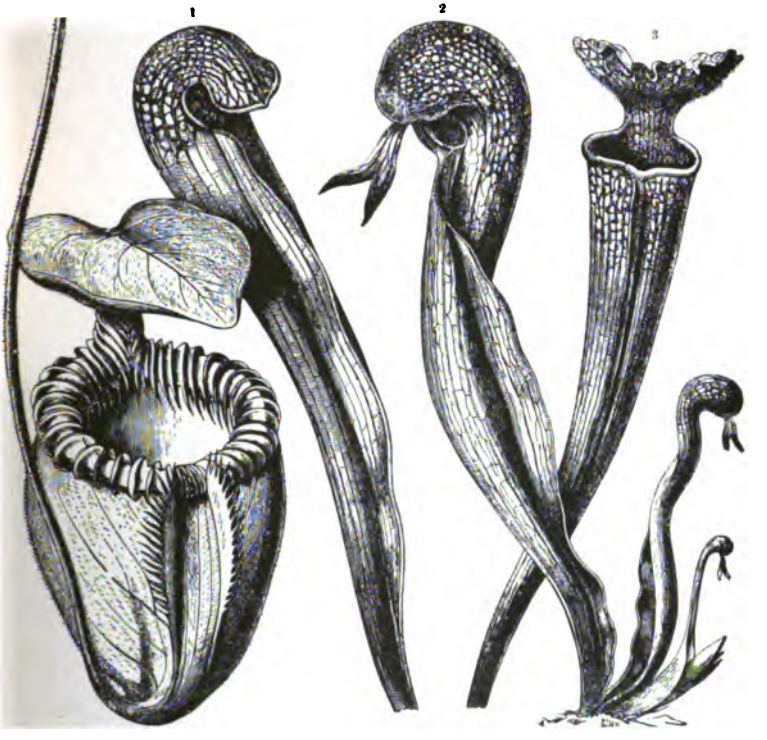


Fig. 5. Trumpet and Pitcher Plants: 1. *Sarracenia variolaris.* 2. *Darlingtonia californica.* 3, *Sarracenia laciniata.* 4. Pitcher of *Nepenthes.* Reduced.

Fig. 6. *Cephalotus follicularis.*

Fig. 7. Young plants of *Nepenthes.*

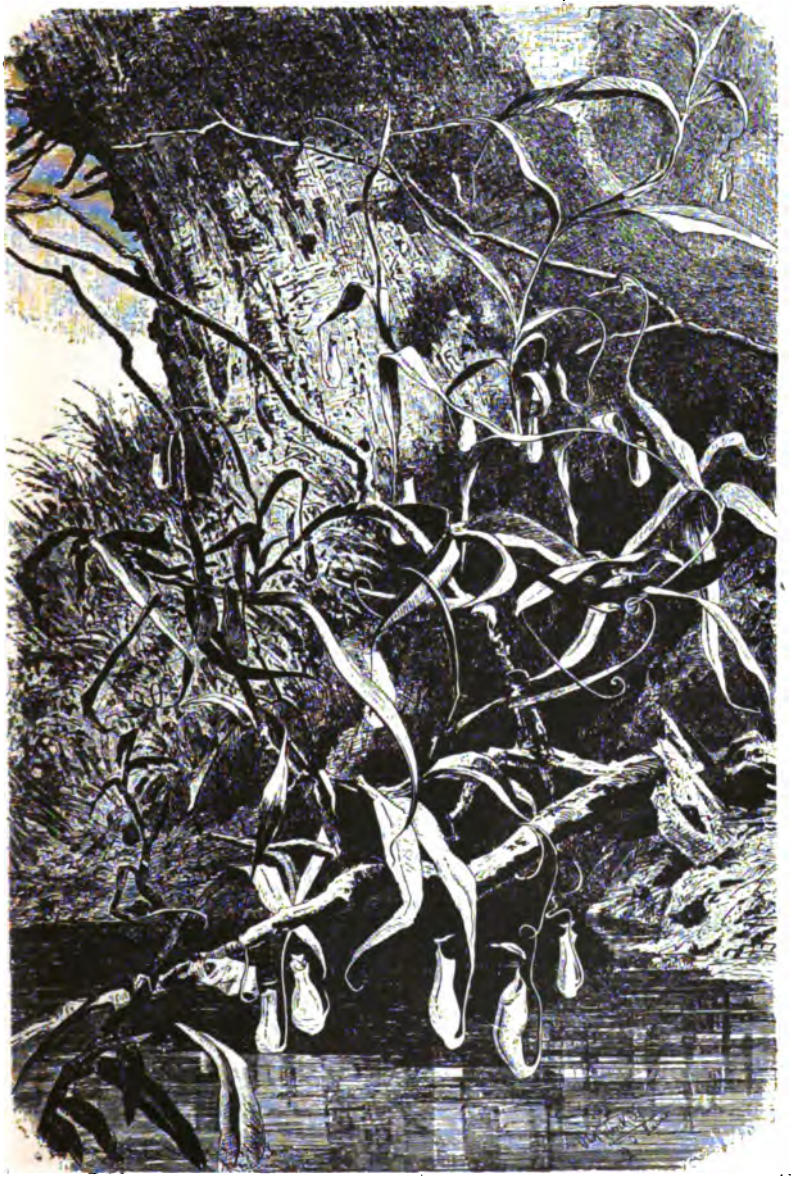


Fig. 8. *Nepenthes destillatoria.*

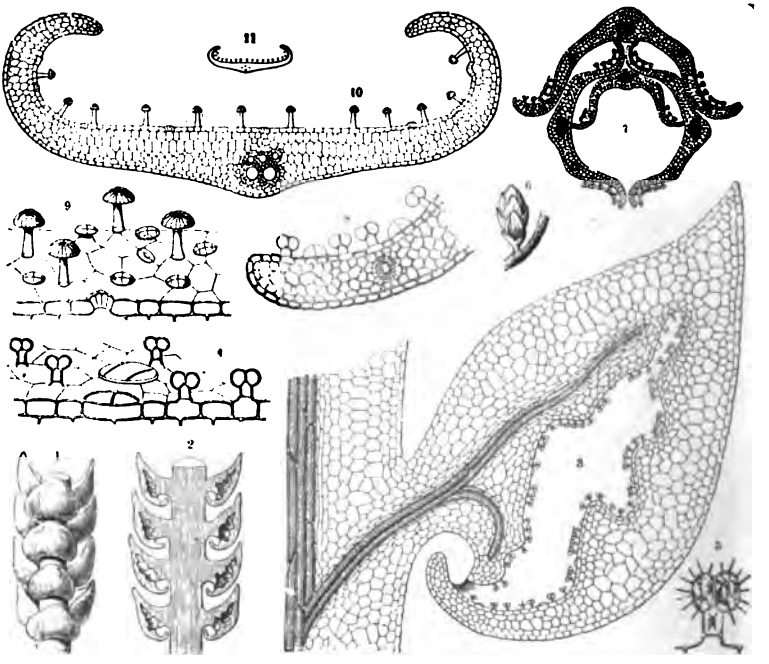


Fig. 9. Traps of *Lathræa*, *Bartsia* and *Pinguicula:* 1. Piece of subterranean stem with leaves of *Lathræa*. 2. Longitudinal section through the same. 3. Longitudinal section through leaf. 4. Piece of interior wall. 5. Plasma-threads extended to feed. 6. Subterranean bud of *Bartsia*. 7. Cross section through it. 8. Wall of cavities. 9. Piece of surface of leaf of a *Pinguicula*. 10. Cross section through the same. 11. Cross section through leaf, a little reduced.

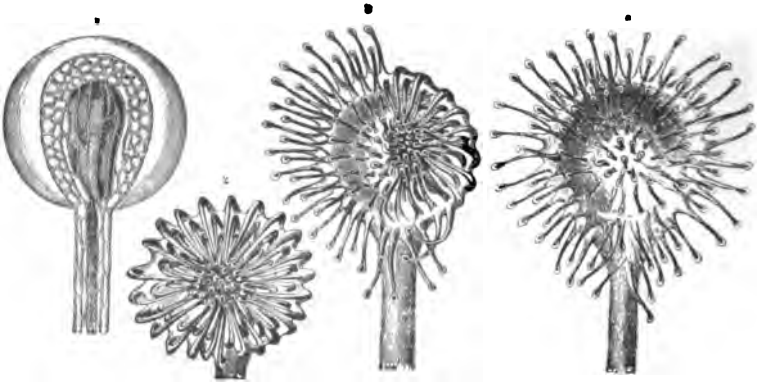


Fig. 10. Tentacles of Sundew: 1. Terminal gland, greatly enlarged. 2. Tentacles of a leaf bending toward centre. 3. Half of the tentacles holding an insect. 4. All tentacles extended.

Fig. 11. Venus Fly Trap (*Dionœa muscipula*)

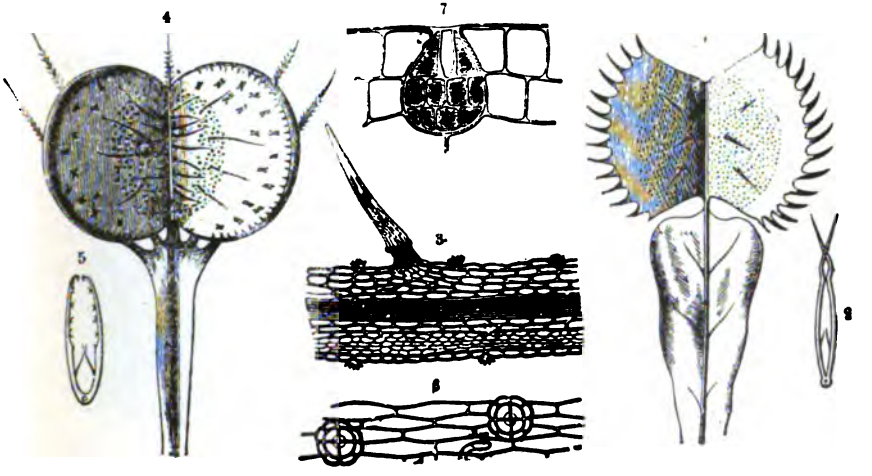


Fig. 12. Traps of *Aldrovandia* and *Dionœa:* 1. Extended leaf with trap of *Dionœa*. 2. Section through a folded trap. 3. One of the sensitive spines. 4. Extended leaf of *Aldrovandia*. 6. Glands upon trap. 7. Glands in the wall of a trap of *Sarracenia*.

Fig. 13. *Aldrovandia vesiculosa.*

Fig. 14. Dew-Plant (*Drosophyllum lusitanicum*)

Southern Europe in shallow ditches and small ponds with very clear water. The plant looks like an *Utricularia*, has no roots, but floats freely in the surrounding medium. Its trap is also shown in Fig. 12 (4-6), and it is not necessary to describe its action, which is very similar to the one described in the Venus fly-trap. The plant consumes small crustaceans, but not as rapidly as the *Dionæa*.

CARNIVOROUS PLANTS CATCHING INSECTS BY MEANS OF STICKY GLANDS.

Forms which are contained in the third class of carnivorous plants show no movements produced by contact with food, but their leaves are covered with glands, which secrete a sticky fluid to catch animals. They also secrete fluids to digest, or which are able to absorb the albumen obtained from the victims. The most peculiar and best known representative of this class is the Dew plant (*Drosophyllum lusitanicum*), a native of Portugal and Morocco (Fig. 14.) This plant differs greatly from the other carnivorous plants thus far mentioned by growing, not in wet places but upon sandy soils or dry hills. The leaves, which occur in large numbers, are linear, ending in slender, thread-like points. Each leaf contains in its middle, upon the upper surface, a longitudinal groove. All the leaves are covered with pearls of fluid, which makes them appear as if covered with dew. These sparkling drops are serceted by glands resembling those of *Pinguicula* and *Drosera*. They agree with the latter in their red color, with the former in their hat or mushroom shaped form. Besides these glands, visible with the naked eye, we find others, without stems, which are colorless and secrete an acid fluid able to digest animal tissues. If an insect flies against a leaf its motion is not arrested but simply retarded. In trying to crawl away it comes in contact with more drops, which soon enclose it entirely, thus preventing escape. It is now absorbed by the flat glands, and only its harder substances are left behind. The secretion of this fluid is a very copious one, and we find in consequence numerous victims in all stages of digestion fastened to the leaves. The number of these victims is so great, that a plant covered with them attracts the attention of every passer by. The farmers near Oporto utilize these plants to catch the tormenting house flies in their dwelling places.

Numerous other plants are enabled by a similar construction to catch insects, for instance: *Primula viscosa*, *P. villosa*, *P. hirsuta*,

Saxifraga luteo-viridis, *S. bulbifera*, *Sempervivum montanum*, *Saponaria viscosa*, and others; also some plants growing near water possess this faculty, as *Sedum villosum*. But it would be wrong to suppose that all plants possessing sticky surfaces upon leaves or stems could also absorb the insects caught upon them. In many cases such sticky surfaces are simply protections of the flowers against unwelcome visitors. Glands which secrete such a sticky fluid may be of a two-fold benefit to the plant possessing them: They may protect against certain insects, and they may also derive benefit from those killed by this glue.

Many plants possess upon the upper surface of their leaves peculiar organs, looking like glands, but which do not secrete. These organs are there to absorb water, and are of great importance is the economy of plants. They can but seldom absorb chemically pure water, and nitric acid and ammonia is almost always obtained with rain from the air. This is very important for plants not able to obtain by means of their roots a sufficiently large amount of these substances. Many leaves show peculiar depressions in which rain is retained for a long time. Dust, small dead animals, pollen, etc., is carried there by the wind, and the water in these depressions soon becomes discolored and contains soluble nitrogenous substances, which are absorbed by sucking cells found in the bottom of these receptacles. They are, therefore, similar to the traps of insectivorous plants, but lack arrangements to invite insects, nor do they prevent their escape; still they form the connecting links with real traps.

Venus fly-trap, the best and longest known of carnivorous plants, has recently started quite an animated discussion in scientific papers. Gardeners claimed that the eating of animal food was of no benefit to the plants, but was on the contrary quite injurious. They found that such plants would thrive without animal food at least as well as with it. Moreover, if fed repeatedly, the leaves would turn yellow and die. If cheese was used as a food the leaf would hold and dissolve it, but would die in consequence. (The kind of cheese was not stated.) But we must recollect that plants in their native home are not apt to overfeed themselves. Larger insects can escape, as we have seen. If we deduct all the hard and insoluble material of the food left behind we perceive that but little albuminous food was really absorbed from their victims. Larger pieces of meat, cheese, white of eggs and other substances used for experimentation are not to be had by a plant in its native home. At all events plants

growing outside of a green-house never show discolored leaves. That they succeed well in captivity without animal food is owing to the better soil in which they grow. If sufficient nitrogen can be obtained from the soil these plants are not forced to catch animal food, but can live very well without it. It is a well-known fact that all carnivorous plants are only found growing in places where the soil is deficient in nitrogenous substances, and their being able to catch insects must be considered as a great advantage to them.

Ladies and gentlemen, I thank you for your kind attention to this rather lengthy paper.

President Elliot said the Society was under obligations to Prof. Lugger for his able and very interesting lecture.

Miss Lizzie R. Smith then favored the Society with a recitation, which was well rendered, entitled "Asleep at the Switch."

On motion of Mr. Harris the meeting adjourned till Thursday morning.

MORNING SESSION.

THIRD DAY, THURSDAY, JAN. 17, 1889.

The meeting was called to order at 9 o'clock by President Elliot.

The report of the seedling commission which was deferred was called for and the following reports made:

REPORT ON SEEDLING FRUITS.

By J. S. Harris, La Crescent.

Mr. President and Members of the State Horticultural Society:

During the past year the greater part of the work of the Seedling Fruit Commission has been performed by my colleagues, Mr. Sias and Mr. Fuller, who will submit reports at the meeting, hence my report will be brief.

In the month of March I paid a visit to a seedling orchard in the eastern part of Martin county, formerly owned by a Mr. Rowe and containing some forty or fifty varieties that were twenty or more years old. About ten of the varieties were in

very good condition, showing marks of great hardiness, but some of them are subject to blight; do not think the fruit of more than three or four of them will be of sufficient value to warrant their propagation. I have arranged with S. D. Richardson & Son, of Winnebago City, to look after them and to give them a trial.

After the adjournment of the summer meeting of our Society, in company with President Elliot I visited the grounds of Wm. Lyons, near Minneapolis, for the purpose of examining a seedling strawberry which he has since named Martha. The plants of this variety are strong growers, with healthy foliage and upon his grounds, very fruitful. The fruit is somewhat larger than Wilson or Crescent, of a bright deep red color, which extends through the berry. The berry is of uniform and pleasing shape, sprightly flavor, firm flesh and will probably keep longer and ship much better than most other varieties. As the plants appeared to be carrying full as many berries and were of considerably larger size than the Crescent, I should estimate the yield to be considerably above that popular variety and that in picking it would have twenty per cent in its favor. The flower is pistilate or imperfectly staminate and most seasons would require the presence of a strong staminate variety near by. It is a week or more later than the Crescent; Glendale and May King are probably the best varieties to use as a fertilizer. It is the only variety Mr. Lyons considered worth retaining out of a batch of seedlings from some twenty cases of berries that spoiled on his hands a number of years since.

I have kept close watch of a new seedling strawberry originated by Mr. Kramer, of La Crescent, known as Early Princess. As grown by him it is the most wonderful variety that has ever come under my observation. The plants last year were strong and vigorous, and the foliage remarkably free from rust and blight. In productiveness it also surpassed every other variety heretofore known. The fruit runs from large to very large. The color is clear, deep red; shape round and very uniform. The fruiting stems are long and strong, and carry the fruit well up until near maturity, when the enormous weight of the berries bears them down. The quality is as good as any of the productive varieties, and I think will suit the taste of the million on account of lack of acidity. At the summer meeting of the Southern Minnesota Horticultural Society, this variety was awarded first premium for single quart of largest berries, over the Jessie

and Bubach. The largest berry measured six inches in circumference. The actual measurement from three pickings from a square rod of ground was five bushels and two quarts in addition to a few specimens that had been selected at different times for exhibition. I did not see the variety until it was out of bloom, but think it is a pistilate. It is growing upon a dry, loam soil. The roots of the plants are strong, and Mr. Kramer says that it withstood the drought of 1887 better than any other variety upon his place. If it should do as well in future years and in other hands as it has with Mr. Kramer it will revolutionize strawberry culture for home use if not for market. The berry is not as firm as the Jessie, but this wet season held up better than the Crescent.

I visited Klein's Seedling apple tree in Houston county some time in August.

The history of the tree is found on page 138 of transactions for 1887. It is now 32 years old and apparently as sound as Duchess upon Mr. Klein's place. It was carrying a liberal crop of fruit of good size and appearance, specimens of which were exhibited at the state fair of 1888; some specimens I carried home kept very well until January 1st. Ordinarily it is considered a fall apple. Owing to its pedigree it may prove valuable as a variety for crossing with the Russians for growing seedlings. I have not seen the Okabena, or Daisy trees this season; but Mr. Ludlow reports they endured last winter without injury.

LAYERING.

On Dec. 24, 1888, I visited the apple orchard of a Mr. Disbrow at Alden, Ill. He has a variety of apples that originated from the seed of a large variety of apples procured in Ohio, some forty years since (probably Bailey sweet). Only one tree from the seed proved hardy and good enough to warrant saving; that one he has propagated by suckers or rootlets, and now has nearly twenty trees in his orchard, ranging from fifteen to twenty-five years old, all upon their own roots. He claims that he has never lost a tree from any cause whatever. The trees are all looking thrifty and sound while every other variety in the orchard shows disease, or decay. It is a regular and good bearer; fruit medium in size, handsome in appearance; delicious, sweet in flavor, keeps well all winter. Has the tree been kept hardy by method of propagating or is it more hardy than what are usualy termed "iron-clads?"

REPORT ON SEEDLING FRUITS.

By A. W. Sias, Rochester.

Mr. President, Ladies and Gentlemen:

Pursuant to a call from our chairman, Mr. John S. Harris, G. W. Fuller met us at Rochester, Sept. 25, 1888, and, after spending a part of the day looking about for new varieties, we left for Kasson the same day.

September 26th, visited the Houston seedlings; found some good specimens yet on the trees. The fruit is of good size and quality, and the tree still looking well. We took the train in the evening for Owatonna, where we stopped over with E. H. S. Dartt. Mr. Dartt has many things to interest and instruct a fruit man. We went over his extensive orchards and were surprised to find apple trees of several varieties in full bearing, where the Ash Leaved Maple was said to be failing. This must be pretty conclusive evidence that he has some extremely hardy sorts. Dartt's Hybrid is flourishing finely. Mr. Dartt took us to see the state school for indigent children, near which is located his experimental station. He has only fairly commenced his good work here, yet he has a large variety of plants considering the short time that he has been in charge of the grounds. We were highly pleased with the progress made. Perhaps it might be said that he is making a speciality of seedlings, yet he is not so one-sided but that he can test any foreign variety that comes well recommended. Was glad to note that he had a keen appetite for evergreens, especially for the Rocky Mountain conifers, and other recently introduced varieties.

September 27th, in company with Mr. Dartt, we visited J. G. Miller, of Rice county. Think he said the Peerless apple tree bore some two bushels this season. The other seedlings bore considerable fruit but the crop was not large in any part of the orchard; we found one very promising seedling that Mr. Miller says is five years old — a seedling from the Wealthy and the fruit resembles it; will perhaps keep as well. It only bore three apples this season. Tree appears to be as hardy as a crab, but Mr. Dartt reminded me that we could not judge of the hardiness of a variety at that "tender age." As I have reported on this orchard once before, I shall depend on my partner, Mr. Fuller, to give you a fuller report.

October 9th, I visited Mr. H. S. Hayes, one of the pioneers of Fillmore county, and a distant relative of ex-President Hayes. He has a fine stock farm and the finest herd of red polled cattle I ever saw. You can find his name in the herd book. One reason why his stock always looks so fat and contented is because they have a large fine native grove to range in, in which flows a fine babbling brook of pure spring water. His stock yards and buildings are also well protected by native trees, and others of his own planting. October 10th Mr. Hayes accompanied me to the little village of Washington, on brook Kidron, near where we found the little clump of native white spruce in 1859, of which we made mention in our last year's report. The owner of these trees claimed that one of them was one hundred feet high when we visited there about a year ago, and Mr. Hayes and myself went there this time prepared to measure them, but the owner had stolen the march on us and had cut them down, and used them for the frame work of a new building that he had recently erected. But as we started out to measure a tree, we concluded to look further, and as we both knew where the first tree was that left that wild clump on the Kidron thirty-four years ago, we left for that place. The farm is now owned by Albert Lyon of Rochester, and the tree measures fifty-one feet and seven inches high and six and one-half feet in circumference one foot above the surface; four feet above the surface it measures five and one-half feet.

This is perhaps the most beautiful specimen of the white spruce that I ever saw. Foliage of a deep blue, and all the branches on the main limbs droop as gracefully as upon the finest specimens of the weeping Norways. Mr. Hayes gave me an introduction to Henry P. Moon, a prominent small fruit grower of his neighborhood — Sumner township. Mr. Moon is making a success with the blackberry, raspberry and strawberry; and he tells us that he also made a success with his apple orchard in Winona county before he moved to Fillmore county. Mr. Hayes showed us a Transcendent crab tree eighteen inches in diameter and some thirty years old that has yielded twenty bushels in a single year. The Beech's Sweet is fine here, and Mr. Hayes says it comes in nice and handy in making that old fashioned New England dish that he is so fond of, viz., sweet apple pudding.

October 11th, visited D. K. Michenor, Forestville, who has twelve acres in orchard, and one of the best in the state. He has some fifteen or twenty varieties, but Duchess and Wealthy

are the best. He has four or five winter sorts. Mr. Michenor speaks hopefully of apple culture in Minnesota, and considers his Duchess trees as valuable as so many cows. Mr. Michenor has a wild grape vine that covers nine large Cottonwood trees on one side of his garden, and furnishes five or six bushels of fruit per year. They sell for one dollar per bushel on the vine. Mr. Michenor has some winter seedling apples that may prove valuable.

Mr. Parkinson of Fillmore county has seedlings from the honey locust, now about twenty-five feet high, straight, handsome as a dollar and apparently perfectly hardy; the most of them were entirely thornless, and I brought away a seed pod from one of them, that measured twelve inches in length.

We inspected an apple tree on the farm of J. S. Ottman, some fourteen miles northwest of Rochester that appears to be a cross between the Hyslop crab and some larger apple. The tree resembles the Hyslop; fruit same color and nearly as large again. We kept it till about January 1st, and with proper care it can be kept longer.

SEEDLING STRAWBERRIES.

We have a seedling of the Jessie, that germinated a year ago last July, now among our house plants, with six berries on it, nearly half grown. Another with a leaf four inches long, and the same in breadth. If the best of foliage is any criterion for judging fruit, then look out for something rich at our next summer meeting.

REPORT ON SEEDLING FRUITS.

By G. W. Fuller, Litchfield.

I visited the Jewell Nursery at Lake City to learn what I could in regard to seedlings they are growing. Mr. Emery, one of the proprietors, gave me every facility for seeing their trees. The three year old Okabena seedlings are fine trees and with few exceptions appeared healthy. I said to Mr. Emery: "These trees look just like the Wealthy." The answer was: "They are probably a cross between the Wealthy and Duchess." I did not see the fruit, but a plate of the apple was shown me, which seemed to me like the Wealthy.

The question was asked: "What evidence have you that this tree is any hardier than the Wealthy?" The answer was: "It is something new."

Some of the Thompson, Iowa, seedlings were looking well, but others were evident failures.

I visited Mr. Sias, at Rochester. His orchard has evidently never recovered from the effects of the tornado which swept over it a few years ago. His orchard is in fine feed as far as grass is concerned, but in addition he is now trying the virtue of a good dressing of manure around each tree. He still holds strongly to some of the Russians and also to the Wealthies of three years' growth, from the roots of trees whose tops had been killed. This is an experiment perhaps worth trying. Some of his Russians are holding on their way, bravely trying to make a success of it.

Mr. Sias and myself visited Mr. Pond, near Kasson, and were pleased to find him successfully entering upon the work of growing small fruits, especially the blackberry and raspberry. He has a yellow raspberry which I think he calls the Golden Queen, which he regards as perfectly hardy, bearing well, without any covering during the winter.

Mr. Pond evidently believes in manure for fruit trees and he showed us some very large, fine Duchess, which bore well the past season, which speak well for his belief. The ground all around under the wide-spreading branches was deeply covered with well rotted manure.

In company with Mr. Pond we visited one of his neighbors, Alex. Houston, and examined a seedling which has been growing on his place for some years. It is rather crowded among other trees and has not had a very good chance to develop itself. The fruit is of fair size and quality, and a pretty good keeper. But we could discover no indications that it was any hardier than the Duchess surrounding it. It will be well, however, to test it by grafting.

We had a pleasant visit with Mr. Dartt at Owatonna and carefully looked through his large orchards. He has met with some success, but we noticed that his wood pile was largely made up from his orchard.

We noticed with interest the neat and orderly beginnings o his experimental fruit and forest tree seedling station and we trust valuable results will be attained. It is located on the state farm near the State Institution for Destitute Children, and should be made of some advantage to the children there educated.

Accompanied by Mr. Dartt, we went some fifteen miles to Dodge City, Rice county, to visit J. G. Miller, the owner of the Peerless seedling. As soon as we stated our errand, Mr. Miller, with a good deal of feeling, said: "The tree is in bad condition," and expressed his regret that so much prominence had been given it. He had no idea that the tree was not perfectly sound until a short time before our visit; someone in climbing the tree to cut scions, if we remember rightly, broke off a limb near the centre of the top which revealed the tree as blackhearted, and a close examination revealed the fact that some of the central limbs were already beginning to die. To say the least the tree was in no better condition than Duchess near by it. The tree is in a very favorable locality, being on high ground, with high willows on the south and west sides. Mr. Miller has one or two seedling hybrids which should be tested and may prove of value.

There is nothing new in regard to the two seedlings before reported in Meeker county. The apple tree of Mr. Mills, in Greenleaf, is dead, having been partly broken down by the wind two years ago. The trees grown from scions from this tree are looking well. They are only two years old. The tree of the hybrids of Mr. Baldion, in Cedar Mills, is still apparently sound and bore a full crop of apples the past season. But the grafts are not very promising, the trees growing rather short and scrubby. This is not, perhaps, anything against hardiness or value of the the tree as a fruit bearer. The original tree is fifteen years old and rather small of its age; but it has not been cultivated or manured.

I have thus tried to state the facts in regard to these seedlings and I think we can from them come to but one conclusion, and that is, that we know of no seedling in our state that has shown sufficient evidence of hardiness to warrant a recommendation for cultivation outside of experiment stations or of individuals who wish to experiment; or that will warrant any man to sell them as hardy in our state, especially at fancy prices.

While forced to this conclusion, we still urge experiments to be continued on this same line, for we may unexpectedly find the hardy tree, bearing the long keeping apple we need in Minnesota. But let us be sure we have it before we say much about it.

Mr. Brand said Mr. Fuller had not given a fair and full report as to the Peerless. If the tree was blackhearted it was due to cutting too many scions. Two years ago the tree bore some eleven bushels of apples and a number of limbs were broken down. He had been informed by Mr. Miller that the tree had borne in all over sixty bushels of fruit and would be twenty-one years old this next spring.

Mr. Fuller said he had presented things as he saw them and as they were, but had said nothing as to causes producing them.

Mr. Dartt suggested that Mr. Fuller had already "been to Iowa." But his claims might be considered with those of his friend Mr. Taylor.

Mr. Taylor said there was usually two sides to a question, but if it was a fact that the tree had borne sixty bushels of good apples it was a very good recommendation.

Mr. Pearse had found by experience that cutting too many scions from young trees would cause them to become blackhearted.

Mr. Gould said he did not doubt Mr. Fuller had given a candid report. He had known Duchess trees, in an orchard near Bloomington, Ill., to be nearly destroyed by cutting scions from them every year.

President Elliot. There is one point I want to emphasize that was referred to in the report of Mr. Harris. It is with reference to layers from new seedlings that are just coming into bearing. When the Wealthy, that grand old tree of Mr. Gideon's, was first brought to our attention, Mr. Harkness and I went out there to his place to examine it. We found he had layered some of the limbs and they were rooted nicely. We purchased what layers he had that spring. To-day the only trees on my place of Wealthy that are alive, are from those layers. If it wasn't for the boys I could show you fruit from them every year; they blossom nicely and are the hardiest Wealthies I know of. I hope horticulturists will experiment more in this direction.

The following paper was read by Mr. Dartt:

SEEDLING APPLE TREES.

By E. H. S. Dartt, Owatonna.

If we have planted the seed of the apple, reared the trees and eaten the fruit thereof, and have grown old in this kind of labor, we certainly know something about seedling apple trees. But if what we know is compared with what we do not know then our ignorance must greatly predominate, for wherever life exists there the mysteries of life creep in. We are told that the sins of the parent shall be visited upon the children down to the third and fourth generation, and we do not know how much further the evil may extend. It seems that the same principle exists in regard to the apple tree—that there are certain defects or taints that have crept all along up from the most insignificant crab of the remotest period to the present time. These defects, some of which may have laid dormant for hundreds of years, are so likely to crop out that artificial hybridization becomes very uncertain in its results and many believe that planting the best seeds and judicious selection will soonest secure that adaptation we are all looking for and perhaps restore the apple to the perfect condition it may have been in when Adam's transgression caused the ruin we read of in the Garden of Eden.

In the planting of seeds we naturally expect the best results from planting seeds of our hardiest Minnesota apples. And though that may be true as a rule, yet I will mention one or two exceptions.

Over thirty years ago a Mr. Bixby, in the south part of Steele county, purchased a barrel of apples in the market and planted some of the seeds. One tree proved remarkably hardy and bore heavy crops of good winter apples for many years. It passed through all the hard winters without much injury till about 1885 and died a year or two later from the effects of climatic influences and old age. About 1870, S. N. Yearly, one mile southeast of Owatonna, had a seedling tree in bearing which had come with trees from an eastern nursery. It also bore a good winter apple, seemed perfectly hardy and for many years produced remunerative crops. Scions of this tree were obtained and root grafted and grown three or four years in nursery and transplanted to orchard. They had but just commenced bearing when they were entirely killed by one or two severe winters. From these instances we may conclude:

First—That very hardy trees may sometimes be grown from seeds brought from a warmer climate, or that a tree produced in a warm climate may possess so much inherent hardiness as to adapt it to a climate much more severe.

Second—That a seedling apple tree, though sufficiently hardy to stand in its original position and be very profitable, may prove of little value when subjected to our methods of propagation and change of location.

We have strong hopes that of the large number of promising seedlings now being tried in the Northwest, some will be found that shall stand this additional test and reassure our doubting people that good apples can be profitably grown in Minnesota. Let us continue to plant our best seed with a view of breeding up to the highest standard attainable.

SECRETARY'S ANNUAL REPORT.

Mr. President and Fellow Members:

We have the honor to submit herewith our fourth annual report. In so doing we are forcibly reminded of the common saying "Time flies." Little did we think five years ago this present month, when called upon to assume the duties and responsibilities of this position, that you would bear with us this length of time. Fortunately, we have had the sympathy and kind cooperation of officers and members of the Society in the performance of duties that have devolved upon us, and though at times we felt misgivings, yet with your kind indulgence and generous assistance we have been enabled to measure up to the success attained. And it may not be inappropriate here to say that in the suggestions offered at this time we shall not aim to teach, since you are so much better fitted by practical experience to give instruction were any needed to be given.

THEORY AND PRACTICE.

Horticulture is not like mathematics, an exact science. It is true we may reason from cause to effect with some degree of certainty. We may study the laws of plant development and growth, observe results that have been reached by close adherence to certain elementary principles, or methods of procedure; but we can neither sow nor plant with full assurance that the desired results will be attained in each and every case. Our field of labor is rather one of observation and experiment. We read the future in a measure by our experience in the past. And, hence, before proceeding in our investigations we find it profitable at times to take a short review.

RETROSPECTIVE.

Permit, Mr. President, a moment's retrospection, for in looking back upon the history of horticulture in Minnesota, we shall observe a fruitful field for study and reflection, and may find cause, forsooth, for some encouragement for the future, on horticultural lines.

We may at times review the history of the past with profit to ourselves, by turning lessons learned to practical account. But, in making this digression you will please to pardon any seeming personal suggestions.

In 1867, we remember very well, on coming to Minnesota, at that period of our history as a state, there was abundant evidence of progress being made in horticulture.

It is not necessary here to mention all the numerous facts that might be shown in proof of the foregoing statement. We need not here refer you to the many fine exhibits made at different times, of fruits of various kinds, reported in our own transactions, or elsewhere so creditable indeed to all those sturdy pioneers, who grew and placed the same on exhibition.

OUR NATIVE FRUITS.

Our first impressions are usually most lasting and often seem intuitive. For instance, we remember very well how pleasing, if not really surprising, in fact, was the effect from casual inspections made concerning all the natural and material resources of the state; especially with reference to our native fruits, indigenous to the soil, found scattered here and there throughout our fertile valleys, rolling prairies and sunny hillsides. It is hardly necessary to add it was to us an interesting sight indeed to witness in the early spring time the beautiful and sweet-scented blossoms of the wild or native crab, which, although worthless as a fruit, appeared in such profusion in our groves and thickets here and there, so that its fragrance was ever pleasing to the passer-by; to see, also, the trees of wild cherry, the numerous groves of wild, or native plum, all covered with their snowy mantle, concealing every sign of bud or leaf; to see in patches now and then, the delicate, snow-white blossoms of the wild strawberry, and, passing later still, to find the ground besprinkled with its crimson-hued and tempting fruit, already ripe and pleasing to the taste.

Such sights as these one readily recalls, which were sufficient to enkindle in the mind of any average horticulturist — especially if he chanced to be an enthusiastic lover of fruit — an admiration for the natural resources and advantages of the state, made more emphatic, too, by seeing all the varied and multitudinous productions of our wondrously fertile soil; and this gave some foundation to the belief in its adaptability to the production of tame varieties of fruit in rich abundance as well as of the finest quality.

We often heard it said, to the disparagement of Minnesota, that apples could not be successfully and profitably grown; and this was urged as argument against its future settlement; that while a few small fruits of various kinds might be depended on, perhaps, it was no fitting place to grow the larger fruits. However, to our mind, this seemed a mere assumption, and the experiment was well worth trying.

We found as we have said, in Minnesota, a soil of unsurpassed fertility. Some of the early settlers said the climate, too, was unexcelled for healthfulness and equability; and, that, although severe at times, it was delightfully agreeable. And so, in spite of some misgivings, we very naturally indulged the hope that we should be enabled soon to grow fine fruits abundantly, of almost every character and kind.

In 1873 we tried our hand at raising fruit. We set five acres out to orchard, and also planted out a lot of native plums. The apple trees were thrifty two-year olds, and though there were too many of the tender sorts among the list selected, we do not doubt that we should have been reasonably rewarded for all our labor and expense had we remained upon the farm and cultivated with the proper care.

EARLY EFFORTS.

You will call to mind that many of our early settlers planted freely of orchard fruits of various kinds, and how their efforts, in spite of want of care in their selection of varieties, were signally rewarded with bounteous crops of fruit. For several years our orchards did not suffer serious injury, and there were many instances of gratifying yields of fruit. Some 30,000 bushels of apples were said to be produced in Minnesota in the year 1872, and as a natural result the average orchardist began to count on paying yields from that time forward. It was not strange, of course that careless methods should obtain, both as to the selec-

tion of varieties and as to methods of cultivation. But the succeeding winter upset these reckless practices; our older orchards were swept away, and nearly every tree was fitted for the brush-pile, and orchards theretofore so promising became a total loss in many instances. And hence it was not strange that those most sanguine in the past should now seem most disheartened or discouraged, for a time at least, regarding brighter prospects in the future.

SMALL FRUITS.

Wild fruits, as we have said, were seen in great abundance in many places, and always found a ready sale; they proved to be at least a temporary substitute for better fruits grown at a distance, in other states. They were, however, inferior in quality to cultivated sorts that were imported, or even those that were produced at home. It was but natural that here and there enthusiastic growers should be found who very soon began experimenting in small fruit culture. Some were successful in a marked degree, and not unfrequently a good supply of fruit was raised at moderate cost. It may not be without some passing interest to call to mind some of the efforts made by these early planters.

STRAWBERRIES.

Experiments have been conducted by quite a number of growers of the strawberry, that prince of berries, by propagating from the seed. In certain instances flattering results have been obtained. The process to any but a persevering person, would seem a tedious one, perhaps, but it has been continued here for many years.

Of those who have pursued this method of seeking to originate choice and hardy seedlings, we mention Geo. B. Wright and Wm. Lyons, of Hennepin county, the latter being one of our leading small fruit growers at the present time, and one who has originated quite a number of promising varieties.

Another of the early pioneers of fruit growing in Minnesota, and also an earnest horticulturist, was Mr. John Hart, of Winona county, who was the originator of "Hart's Minnesota Seedling," a variety which he considered quite superior to Willson's Albany. The berry has found many warm admirers, not only in this state but elsewhere.

J. C. Kramer, of La Crescent, has met with marked success in propagating seedlings. He is the originator of a promising berry known as "Early Princess." The variety was named by

a committee appointed for the purpose, at our summer meeting, in 1886. Specimens of its fruit were also placed on exhibition at our last summer meeting, and certainly were very large, of fine appearance, and said to be of excellent quality. The stories told of its productiveness on Mr. Kramer's grounds, would seem extravagant if true—at the rate of about eight hundred bushels to the acre. He has another seedling of nearly equal merit called "Kramer's Seedling No. 2." He has experimented over twenty years, and has at last succeeded in bringing out these candidates for public favor.

SEEDLING GRAPES.

Some of our enterprising grape growers have met with good results in their experiments with new varieties. By careful tests, conducted in some instances for many years, they have originated quite a list, a few of which seem worthy of propagation, or at least of general trial.

Among those who have been engaged most actively in this enterprise we mention Chas. Luedloff, of Carver, and R. Knapheide, of Ramsey county.

Messrs. Latham, Gould and Stubbs, of Hennepin county, J. Norquist, of Red Wing, Messrs. Harris, Schaller and Kluss, of Houston county, and many others that might be named, have each and all demonstrated very thoroughly that grape growing is an industry that may be prosecuted quite successfully in Minnesota and with a fair amount of profit.

That fine varieties of grapes are annually produced is certain, and numerous awards have been secured at different times which indicate superior merit, as at the Exposition at New Orleans, and elsewhere. It is most gratifying, too, to note that the industry is rapidly upon the increase throughout the state.

OUR NATIVE PLUMS.

Of what has been accomplished in the propagation of seedling strawberries and grapes, may be asserted with equal force concerning native plums; that is to say, that in their cultivation there has been gratifying progress made.

O. M. Lord, of Minnesota City, is quite a specialist in this direction, and justly is regarded as good authority on the subject. He has experimented largely and made the question one of thought and study, and has upon his grounds many leading kinds of seedlings as well as cultivated sorts, that have become

well known throughout the Western states. He claims the Rollingstone, originated in Winona county, is, everything considered, as good a native plum as can be found in Minnesota. In his experiments of late he has been carefully investigating concerning best methods of cross-fertilization, the character of the pollen in the blossoms of different sorts, etc.

SEEDLING APPLES.

When we consider what is being done in the direction of originating new varieties of seedling apples, we have a pretty large field. The apple is perhaps the most important of the larger fruits. There is nothing to exceed it in popular favor, everything considered. It will at once take rank, at least in the estimation of most lovers of fine fruits, with the delicate peach, the juicy plum, the luscious pear and the sprightly orange.

There are not a few who have steadily maintained that choice and hardy varieties would be obtained in proper time in Minnesota. Hence, quite a number of our more enthusiastic experimenters have planted seeds and have endeavored to originate a new variety that should possess sufficient hardiness, and show an excellence in quality that should at once commend it to the favor of the average farmer and fruit grower.

Peter M. Gideon, of Excelsior, has, perhaps, been as active as anyone in the state in his endeavors to originate new varieties. He has experimented largely with hybrids, crossing them with native sorts. His methods have been heretofore described by him and need not be repeated here.

We do not propose at this time, to enter into any discussion of the merits of the numerous varieties originated and recommended by Mr. Gideon. His Wealthy has obtained a world-wide reputation. Its hardiness of tree, its showy fruit, its size, its excellent flavor and good keeping qualities, are some of its points of excellence.

As to the work accomplished in this experimental field, we simply make this passing note, but call attention more particularly to the elaborate reports upon this subject, prepared for this Society by our able seedling commission.

HYBRID VARIETIES.

The Siberian crab and the hybrid varieties endure extremes of temperature of summer and winter, succeeding well in nearly

every portion of the state. The fruit is of a sprightly flavor, pleasant and palatable, and is well adapted for culinary purposes. There is a large and growing list of these varieties. They have their earnest friends who claim the fruit is useful, and that it serves the purpose of a substitute for standard fruit. The trees are usually very vigorous of growth but badly predisposed to blight.

RUSSIAN APPLES.

Much has been said and written upon the subject of growing new Russian fruits. The question has been argued pro and con at length. We think their merits as a rule have not been over-estimated, especially in Minnesota, or in localities that have a very trying climate. We find that those who have experimented with them largely are most outspoken in their favor, with some exceptions to this rule. It has been claimed in fact there are some kinds among the Russian apples much hardier than Duchess or even than the native oak. The trees in orchard are vigorous and thrifty, and in some instances at least yield handsome crops of fruit from year to year.

Mr. Charles Gibb, of Abbotsford, who is regarded as perhaps one of our best authorities on this subject, in a paper on Russian apples, read before the annual meeting of the Montreal Horticultural Society about one year ago, says: "The uncertainty of these fruits of Western Europe in the colder parts of this continent, both in the Eastern states and on the Western prairies, directed attention to the colder districts of Eastern Europe." Speaking of a personal visit made to Russia, in company with Prof. J. L. Budd, of Iowa, he continues: "We found St. Petersburg and Moscow not specially favorable to orcharding; but four hundred and thirty miles to the east of Moscow, in latitude 54°, six hundred miles nearer the north pole than Quebec, we found apple growing the great commercial industry of the people. Here the winter temperature for the winter months is 9° above zero, which is the mean for the winter quarter for a period of no less than fifty-nine years. That is nearly 7° colder than at the city of Quebec." He further states that the climate there is milder than at Kazan, in Russia, by 3°.

Continuing, he says: "Let me comfort you then with the fact that in no part of the Province of Quebec where we are likely to grow apples, is it colder than in the extensive orchard regions of Kazan. You have great diversity of site in this province. Choose your hillsides, not your bottom lands, unless near large bodies of

water, thus avoiding late spring and early autumn frosts. As you go north your difficulties will increase, yet you have no such difficulties to cope with as they have on the western prairies."

He recommends for colder climates a short list of varieties, and in doing so says: "I give this with a good deal of hesitation, from unripe experience, but give it in part from their behavior in my own orchard, and in part from trees I have seen in fruiting in Wisconsin and elsewhere in the United States; in order of ripening, either Yellow Transparent, or Thaler; raspberry, Titovka, Golden White, Longfield and Arabka."

Hon. H. E. Van Deman, chief of the division of pomology in the United States Department of Agriculture, has kindly forwarded for distribution at this meeting, a number of his bulletins, No. 2, being a report on "The adaptation of Russian and other fruits to the extreme northern portion of the United States." It contains much interesting and valuable information upon this subject, which is therein exhaustively considered. This pamphlet was, we understand, mainly prepared by T. T. Lyon, of Michigan, who is no doubt one of the ablest living pomologists of the land, and we bespeak for it a careful perusal. Mr. Lyon is of the opinion that "these Russian fruits have been brought to an adaption to a climate not originally inherent in the species, and their introduction to the trying climate of our central prairie region affords an advanced starting point from which desirable results may be soon reached." And as to Russian apples, he believes that "actual trial" will alone demonstrate their merits and value.

INTENSIVE HORTICULTURE.

Prof. Taft, now in the chair of horticulture in the Michigan Agricultural College, in a recent paper on this subject, says: "We may liken horticulture to a broad field, at one side of which the various flowers, fruits and vegetables are growing in almost their wild condition, with slight care and training. As we pass along we notice that more attention has been given to the selection of soil and varieties, to training, pruning and cultivating, and these evidences of care increase until, at the farther side, we find that every method known to benefit or render the development of the crops more perfect, has been employed."

It will not be disputed that horticultural science within the past ten years has made most wonderful advancement. Intensive methods are steadily gaining ground in public estimation. All

the conditions necessary to success are now brought into requisition and utilized. It would appear to us more real progress is being made now in a single decade than formerly was to be noticed in a hundred years.

The principles pertaining to this industry are taught more thoroughly than heretofore. Our agricultural and horticultural press is taking higher rank, and seems to occupy a broader field for usefulness than formerly. Our editors now-a-days, we must admit, are as a rule intelligent, discriminating and wide-awake — alive to everything which augurs for the public good. Whenever any new device, or better process is discovered, they gladly spread the facts before the public and favor the selection of the best.

If you will pardon the suggestion, Mr. President, without intention at flattery, or overstatement, we venture the assertion that horticulturists as a class are public benefactors. We find them always laboring unselfishly for others' good; their plans and methods are an "open book." They patiently investigate for years and carefully experiment, in order to discover methods sure to meet the highest measure of success, and after toilsomely attaining useful knowledge of the art, they quietly proceed forthwith "to give it all away!" Where else do we meet such generous magnanimity?

HORTICULTURAL EDUCATION.

Among the many indications of progress being made along these lines, it is most gratifying indeed to note the fact that education and scientific methods are being brought in requisition; the chemist's laboratory is opening up an interesting field for study and discovery. New facts are daily brought to light, eliciting information which perhaps our fathers never even dreamed about. As evidence of this we see in vegetable pathology investigations being made to learn the cause of plant disease, of fungus growths, and the like, the various remedial agents being tried to ascertain what are the most effective remedies; the laws of plant development and growth are being thoughtfully and patiently considered; attention is being given to principles pertaining to the germination of seeds and bulbs; the laws of reproduction, cross-fertilization and hybridization; methods of destroying noxious insects, or how to check their ravages by the use of poisonous substances or insecticides; and last, perhaps, but not the

least important, most advantageous means for gathering, storing and marketing the various products raised. All these are hopeful indications of steady progress being made along this line.

EXPERIMENTAL STATIONS.

No doubt much good will be accomplished by the investigations being carried on at various experimental stations throughout the land. This work is certainly a most important one if properly conducted or carried on. In our report three years ago, in reference to this subject we took occasion to call attention to some of the benefits to be derived in this direction from actual experiments by horticulturists, for the promotion of theoretical and practical horticulture in this state; we sought to show the need of systematic effort being made. Among the lines of research and experiment named as proper subjects for investigation, were the following: "Protection from contingencies of climate; effects of drought; averting injuries to fruit from scorching heat, from storms in summer and disastrous frosts in winter; originating new varieties of the hardiest, healthiest and best kinds of fruit trees, plants, flowers, vines, and shrubbery; (casting out worthless and unworthy); studying the nature of plants, their diseases, their acclimation and methods of cross-fertilization; the habits and influence of insect life upon plants and fruits, and carefully noting the results."

Now that the Hatch experiment law has been made effective we have been fortunate at last in getting our central station so thoroughly equipped for work. It has been officered with earnest and thorough-going men who will undoubtedly endeavor to bring about the best and most practical results. Since the conditions are now so favorable we do not doubt that every proper means will be employed to make our station among the very foremost of the land. The horticultural department is especially well equipped and manned for work. It was, no doubt a fortunate selection of a site — near St. Anthony Park — in many ways that might be named.

T. T. Lyon, president of the Michigan Horticultural Society, in his address a few days since, at Grand Rapids, in speaking of their station recently equipped, now under the control of the agricultural college of that state, has this to say: "It may reasonably be anticipated that with the special and recognized horticultural standing of this state, horticulture, and especially

pomology, will be made a prominent feature of its system of experimentation. There is, however, a very serious, if not in fact insurmountable obstacle in the way of successful pomological experimentation at the college, namely, the location of the institution in the low and frosty valley of the Cedar river, where only the more hardy fruits can be successfully grown."

Upon the other hand this feature seems to us as quite desirable; for why should not these stations be situated where the severest tests of climate, soil, or rigorous treatment may be had? And where the new varieties of fruits, that may from time to time be recommended, will only be such kinds as have been shown by rigid tests to have sufficient merit to recommend them to the public use at large.

ARE THEY A FAILURE?

We have no patience with the pessimistic notion that "it doesn't pay" to make experiments. In view of all the progress being made and the results accomplished in the past, such empty arguments should be like cobwebs, quickly brushed aside. The proofs to us seem wellnigh overwhelming.

We are reminded that our favorite vegetable, the potato, comes from the small and bitter wild variety, which has its native home along the rocky coast of Chili, South America. Dean, in his New England Farm Dictionary, published in 1790, says: "No longer ago than 1740 we had but one sort, a small, reddish colored potato, of so rank a taste that it was scarcely eatable." But on the contrary, we find to-day, a single American experimenter, guided by the knowledge since acquired, claims to have tested and produced six thousand different varieties.

Our turnips, cabbages and cauliflowers, all come from different species of brassica, which in their native form have bitter, woody stems and leaves and worthless roots.

That sweet-scented and umbeliferous plant, the common carrot, was propagated from the small and spindling wild variety.

Tomatoes (*solanum esculentum*) are of American origin and have been brought to their present degree of perfection within a very recent period.

The apricot, which has become a favorite fruit, was found growing wild in Armenia and Persia, and was from so small and sour a variety as to be considered of little value. The common plum, the varieties of which are very numerous, are said to have been grown from a shrubby plant of southern Russia.

It is said the pear (*pyrus communis*), grown generally throughout continental Europe, is sour and bitter, and scarcely fit for use.

The common grape vine (*vitis vitifera*), is a native of central Asia. From our common northern fox grape (*v. labruska*), sprung most of our valuable tame varieties.

Our favorite fruit the common apple (*pyrus malus*), as is well understood, has been brought to its present degree of perfection by a long and tedious process. The European crab apple is supposed to be the kind from which all others have sprung.

And thus we find that nearly everything of use for food, of vegetable, fruit, or grain, has been improved by careful cultivation and propagation, and by the use of scientic, or experimental methods, which in some instances have been continued through quite extended periods of time. We therefore do not doubt that great and lasting benefit will be derived from the experiments to be conducted, and from the information to be gained at agricultural stations which have lately been established in our own and other states. We trust that sure and constant progress may be made in this direction.

METEOROLOGY.

Much has been said and written concerning the peculiar and somewhat phenominal climate of Minnesota. Meteorology is a subject of never-failing interest in all its many phases. This science is much better understood than formerly, since it is now made a subject of scientific study and investigation.

We merely wish to call attention to the importance of gaining more accurate information. We daily make some observations of the weather, and yet how little do we understand the laws that govern, or control these many changes. In order to succeed at raising fruit, the industry must be adapted to a large extent to the latitude, the conditions of the climate, and the environment. It has been often said that efforts made at growing any of the larger fruits in Minnesota, such as the apple, peach or pear, must be attended with very serious difficulty, rom the contingencies which exist in a changeful and very trying climate. Our atmosphere is dry and bracing, and great extremes of temperature are found at every season of the year; although it may be said perhaps there are few places to be found that boast a greater number of pleasant and sunshiny days than in Minnesota.

These marked and sudden changes, especially of the summer and winter months, are often very trying to trees of various kinds.

We are indebted to P. F. Lyons, of the United States signal service, for some valuable statistics of observations taken at St. Paul. The normal winter temperature, deduced from sixteen years' observations, is as follows: December, 17.7; January, 11.9; February, 17.7; average, or mean for winter months, 15.8 degrees. This is practically identical with the winter temperature at Quebec.

The following table will be found of interest as it exhibits at a glance some of the difficulties to be overcome in raising fruit successfully in Minnesota. For instance, the mean temperature for 1888 was below 40°, accounting for the fact that grapes the present season have ripened badly.

SUMMER TEMPERATURE.

Following is a table showing average summer temperature at St. Paul from 1871 to 1888 inclusive, to which is appended the normal summer temperature. The deductions are made from the means for June, July and August of each year.

YEAR.	Av'rage	YEAR.	Av'rage
1871	68.1	1880	68.9
1872	69.6	1881	70.8
1873	71.3	1882	67.9
1874	71.2	1883	67.3
1875	66.9	1884	69.3
1876	70.0	1885	68.1
1877	69.8	1886	69.4
1878	70.7	1887	69.9
1879	71.3	1888	68.2
Sums			1248.7
Normal			69.4

NOTE.—Just before going to press Mr. Lyons gives us the mean temperature for winter of 1888-9 as follows:

Mean temperature, as deduced from maximum and minimum temperature, December, 1888, 24.9; January, 1889, 20.2; February, 1889, 10.2; average, 18.4.

TABLE IV.

ANNUAL MEANS, NORMALS AND DEPARTURES THEREFROM. ANNUAL NORMAL TEMPERATURE FOR ST. PAUL, 43.6°; PRECIPITATION, 28.99 IN.

YEAR.	TEMPERATURE.						PRECIPITATION IN INCHES AND HUNDREDTHS.	
	Mean.	Excess or Deficiency.	Highest.	Date.	Lowest.	Date.	Total.	Excess or Deficiency.
1871.....	43.6	.....	.....	No Data	No	Data	30.63	+ 1.64
1872.....	Dta In	c'mplt	.....	.....	—16.0	Jan. 31	Data	Inc'mplet
1873.....	41.6	—2.0	92.5	July 16	—29.0	Jan. 28	34.75	+ 5.76
1874.....	43.3	—0.3	99.0	July 6	—23.0	Jan. 14	35.51	+ 5.52
1875.....	39.8	—3.8	95.0	July 15	—32.0	Feb. 9	30.66	+ 1.67
1876.....	42.3	—1.3	93.0	Jul 1–8	—27.0	Dec. 9	23.66	— 5.33
1877.....	47.5	+3.9	93.0	July 17	—26.0	Jan. 8	28.80	— 0.19
1878.....	48.3	+4.7	96.0	July 16	—13.0	Jan. 1	22.80	— 6.19
1879.....	45.5	+1.9	92.0	Aug. 29	—39.0	Dec. 25	32.39	— 3.40
1880.....	44.1	+0.5	98.0	Aug. 13	—27.0	Dec. 28	29.76	+ 0.77
1881.....	45.2	+1.6	96.2	Aug. 11	—25.0	Jan. 11	39.16	+10.17
1882.....	45.6	+2.0	95.0	Aug. 14	—18.5	Dec. 7	23.14	— 5.85
1883.....	40.9	—2.7	100.0	July 1	—31.0	Jan. 22	26.70	— 2.29
1884.....	43.7	+0.1	90.0	July 24	—31.5	Jan. 4	26.11	— 2.88
1885.....	42.0	—1.6	94.7	July 30	—35.6	Jan. 2	25.33	— 3.66
1886.....	42.6	—1.0	94.2	Aug. 4	—33.9	Jan. 23	22.89	— 6.10
1887.....	42.1	—1.5	93.9	July 15	—35.7	Jan. 18	25.85	— 3.14
1888.....	39.9	—3.7	94.0	July 11	—41.2	Jan. 21	25.86	— 3.13
1888.....	39.9	—3.7	94.0	Aug. 2	—41.2	Jan. 21	25.86	— 3.13

Note in the columns of this table headed "excess or deficiency," the plus (+) sign indicates above normal, and the minus (—) one, below normal. The data in this table has been carefully determined from the records at St. Paul, and compared and verified at the chief signal office, Washington, D. C.

P. F. LYONS,
Observer Signal Service, U. S. Army.

THE AMERICAN HORTICULTURAL SOCIETY.

Among the most important horticultural gatherings held since our last annual session was the meeting of the American Horticultural Society, in January and February last, in the state of California. The meetings were well attended by distinguished horticulturists of the land, and the discussions had at the meetings were of marked interest and appropriate to the occasion. Our Society was well represented by Messrs. J. T. Grimes and our worthy President; the former at San Jose, and the latter at Riverside, and who will make suitable reports.

The efficient and worthy secretary of that society is with us at this meeting. He has labored with ceaseless energy to place that society in the fore front as a representative national institution. In this effort he has succeeded admirably. We are indeed fortunate in having him with us at this meeting.

THE AMERICAN POMOLOGICAL SOCIETY.

The twenty-second biennial session of this long established and popular society holds it next meeting in Florida, commencing February 20th, continuing three days. It is important that our Society should be represented at the meeting. Much has been accomplished in the interest of American pomology by this organization, which should be encouraged and sustained. We are highly honored in having with us one of its charter members who assisted in 1848 in founding the society, in the person of Prof. Cleveland, who for a number of years has been engaged in the important enterprise of beautifying the public grounds of Minneapolis and St. Paul.

THE PAST YEAR

was on the whole a most favorable one for growing fruit. Some serious losses were, however, experienced from the late spring frosts as well as from the early frosts of autumn, the plum crop especially being cut short by the former and grapes by the latter. With a few more warm, sunny days our grape crop would have been quite large.

Apples were an unusually abundant yield, of fine appearance and of excellent quality. Where orchards had received the proper care and culture, the tendency was to an over production, and to the injury of trees in certain instances. For the first time many of the new Russian apples were fruited. Some of the more promising seedlings also bore well the past season.

The crop of small fruits was generally satisfactory. Cranberries, however, were injured by the frost, where grown without protection or cultivation of any kind. One of the largest crops of this fruit ever produced by artificial means, was grown in the adjoining State of Wisconsin, by A. C. Tuttle and others, who gathered we understand, one hundred barrels per day of this choice fruit, during the early days of September for which they found a ready sale at remunerative prices.

FRUIT AT THE STATE FAIR.

At the state fair, under the auspices of our Society and the superintendency of our worthy President, there was a very fine exhibit made of fruits, of apples, grapes, small fruits in jars, and also plants and flowers.

The fine display of New Russian varieties of apples, some seventy-five in number by A. G. Tuttle, of Baraboo, attracted much attention and very effectually convinced some of the skeptical who witnessed the large and beautiful specimens of fruit, concerning the production of choice fall and winter apples in this northern region. This fine exhibit is worthy of more extended notice than can be given it at this time. He was very justly awarded first prize on his fine collection, all of which was from his own orchard, in Wisconsin.

Wm. Somerville, of Olmsted county, exhibited nearly fifty varieties of apples from his orchard, including some twenty-five varieties of New Russians. One variety called "Russian Wax" attracted much attention; its genuineness as a real apple was even questioned by many till critically examined. There were several other fine exhibits made. The display of fruit in general was indeed most creditable to all.

The many varieties of grapes exhibited by Messrs. Latham, Knapheide, Pearse, Gould and others, also made a fine display, the most of which appeared to be fairly well ripened before September 10th, the opening day of the fair.

THE STATE AGRICULTURAL SOCIETY.

In this connection we wish briefly to refer to the state agricultural society, under the management of its president, the present governor of the state, and its efficient board of managers and secretary. The annual fair was well attended, and, considering the shortness of cereal crops in general, the display of farm products, including live stock, was very creditable to the state. The program was well carried out in spite of one or two rainy

days. The management are to be congratulated on their success in dispensing with the services of the gambling fraternity, with their numerous wheels of fortune and games of chance, of every kind.

The statement of the treasurer, at the annual meeting held at St. Paul last week, indicates the society is established upon a very satisfactory basis.

The receipts of the agricultural society, as shown by the report of its treasurer, include the sum of $52,400 on account of the annual fair, $25,000 balance of state appropriation, and some small items, which, with a balance of a little over $3,000 on hand, swell the grand total of receipts for the year to $81,588. Of this amount, $25,000 was paid on indebtedness the of society, and $45,452 for fair expenses. The property assets of the society are estimated at $575,786, including 200 acres of land valued at $2,000 per acre, and about $170,000 in buildings and fixtures. This is indeed a very creditable showing.

At the annual meeting in St. Paul last week, on motion of Col. J. H. Stevens, on a close vote, a somewhat radical change was made with reference to annual meetings. In place of the annual election of officers and the usual routine of business, the annual meeting is to consist of a three days' session, with a program of exercises to include addresses from speakers of ability on agricultural topics, etc., the transactions of the society to be published in connection with reports from the state dairymens' association, the poultry, and other state associations of an agricultural nature which do not at present publish their proceedings. This plan has been followed for some years past in Wisconsin, provision being made in that state for the publication of 15,000 copies of the transactions of the state agricultural society.

THE SOCIETY.

It is unnecessary here, perhaps, to state the fact that our own Society is making steady progress; nor would it be expected that mention should be made of all our various lines of work. With some degree of satisfaction we may glance at what has been accomplished in the past, and feel encouraged to renew the work that seems to lie before us. New fields of work are being brought to light, and in this busy age of progress, there is constant need of putting forth our every effort to reach the highest measure of success and usefulness.

Some of our eastern friends seem to be troubled by the fact that we have such a live and wide-awake society in this progres-

sive northern region, as may be gathered from the following pleasant complimentary notice, from that reliable seedsman, Mr. Peter Henderson, of New York, who writes:

NEW YORK, July 31, 1888.

S. D. Hillman, Secretary, etc.,

DEAR SIR: I am in receipt of the annual report of the Minnesota Horticultural Society, and a glance at it indicates that it is exceedingly well gotten up, and must be very interesting reading. It is certainly to the credit of you Western men to get up anything so successful as your Society seems to be. With our two millions of population of the city of New York and vicinity, we have never been able to permanently keep alive a horticultural society; we have one in existence now, but I am afraid it is on its last legs. What is the reason of it? I have tried my best to discover and have failed to get at any cause, but it has been tried for the last fifty years, and in no case has the society existed more than fifteen years, and then in a from-hand-to-mouth sort of way. Yours very truly,

PETER HENDERSON & SON.

It is unnecessary here to add, perhaps, that this Society has much to do to make it in the future a wide-awake and really progressive institution. Nor can its officers, however earnest, do all the work required. They need the co-operation and united support of all its members and earnest friends.

VOLUME SIXTEEN.

The last number of our transactions was issued in the month of June. Though less voluminous than the preceding number, it still contained 464 pages. Typograpically the work was executed with much care by Messrs. J. W. Cunningham & Co., the painstaking publishers. Of the 3,500 copies issued, 900 were bound in cloth, including 300 at the expense of the Society. The larger portion of the edition was distributed among our members, local societies, and among those entitled by law to receive a copy.

Many complimentary notices were received concerning our report which speak with credit of the work of the Society.

In conclusion it may be proper to proper to add that an apology is due the Society for this hastily prepared and quite too lengthy report. We are admonished that our space is limited, and that it is highly important that brevity and conciseness of statement is required on every page, in order to bring our next volume within reasonable limits, and to secure the publication of what is truly valuable.

FINANCIAL REPORT OF SECRETARY.

The following is a statement of receipts and disbursements by the Secretary for the year ending Jan. 15, 1889, as shown by itemized statement submitted:

The amount of membership fees received by the Secretary during the year was..... $81 00

DISBURSEMENTS.

Library set, report American horticultural society.....	$2 00
Stationery	10 15
Expressage on reports.....	13 35
Postage stamps and cards.....	25 50
Membership fees paid treasurer.....	30 00
Total.....	$81 00

Respectfully submitted,

S. D. HILLMAN,

Secretary.

TREASURER'S ANNUAL REPORT.

To the President and Secretary of the Minnesota State Horticultural Society:

Following is a statement of receipts and disbursements from Jan. 20, 1888, to Jan. 17, 1889, inclusive:

RECEIPTS.

1888.		
Jan. 20.	From J. T. Grimes, treasurer	$510 42
Jan. 20.	Membership fees from W. H. Brimhall	19 00
Jan. 20.	Membership fees from S. D. Hillman	30 00
Jan. 20.	State treasurer, one-half annual appropriation for 1887	500 00
Jan. 20.	Membership fees	6 00
Aug. 2.	State treasurer, one-half annual appropriation for 1888	500 00
Aug. 2.	Membership fees	3 00
1889.		
Jan. 16.	N. J. Stubbs, overpaid on premium	1 00
	Total receipts	$1,569 42

The following disbursements have been made, as shown by vouchers returned:

DISBURSEMENTS.

1888.		
Jan. 20.	R. A. Latham, prize essay on grape growing	$25 00
Jan. 20.	Archie N. Wilcox, prize essay on strawberries and raspberries	25 00
Jan. 20.	Burton T. Wilcox, prize essay on blackberries and dewberries	25 00
Jan. 20.	N. F. Brand, prize essay on orcharding	25 00
Jan. 20.	S. A. McHenry, prize essay on oseberries	25 00

Jan. 20.	S. D. Hillman, balance of account of 1887	8 95
Jan. 20.	S. D. Hillman, fourth quarter's salary	125 00
Jan. 20.	Wyman Elliot, salary for 1887	25 00
Jan. 20.	A. W. Sias, vice president and expenses to Dakota	29 00
Jan. 20.	G. W. Fuller, expenses as vice president	3 90
Jan. 20.	E. H. S. Dartt, expenses as vice president	2 75
Jan. 20.	J. S. Harris, expenses on seedling committee	17 00
Jan. 20.	J. M. Underwood, expenses on executive committee	3 00
Jan. 20.	H. A. Gale, for use of Market Hall rooms	40 00
Jan. 20.	W. A. Fisher, entertainment of delegates	13 50
Jan. 20.	E. A. Cuzner, salary as librarian	10 00
Jan. 20.	Premiums at winter meeting	93 00
Jan. 20.	M. Cutler, expenses as vice president	2 25
Feb. 28.	S. M. Owen, address on forestry, 1,000 copies	25 00
Feb. 28.	O. F. Brand, expenses on executive committee	2 25
May 15.	S. D. Hillman, first quarter's salary	125 00
June 28.	Premiums at summer meeting	109 50
June 15.	J. W. Cunningham & Co., circulars	6 00
June 28.	J. W. Cunningham & Co., binding 300 reports	90 00
July 31.	S. D. Hillman, second quarter's salary	125 00
July 31.	P. J. Geisen, packing and expressing reports	22 25
June 28.	J. S. Harris, expenses at summer meeting	10 88
Oct. 1.	S. D. Hillman, third quarter's salary	125 00
Oct. 1.	S. D. Hillman, postage on reports	102 00
Oct. 8.	Geo. W. Fuller, expenses on seedling committee	32 26
Nov. 17.	A. M. Pratt & Co., paper and twine, tying reports, etc	10 00
Nov. 22.	A. W. Sias, expenses on seedling committee	26 79
1889.		
Jan. 3.	Brown, Treacy & Co., programs, etc	14 75
Jan. 17.	Salary of treasurer	25 00
	Total expenditures	$1,350 03
	Balance in treasurer's hands	$219 39
		$1,569 42

Respectfully submitted,

DITUS DAY,
Treasurer.

The report of the Treasurer and the financial statement of the Secretary were referred to the finance committee.

Subsequently Mr. Harris, Chairman of the Finance Committee, presented the following report:

The Finance Committee report that they have examined the books and vouchers of the Treasurer and find them all correct.

That they have also examined the financial statement and itemized account of the Secretary and find the same correct.

LIBRARIAN'S REPORT.

Mr. President:

As most of the members are doubtless aware, the agricultural building on the university campus was badly wrecked by fire on the night of Sept. 26, 1888. Our reports suffered with other things. Those on shelves or in cases were damaged but little, while those piled on the floor were badly disfigured by the water and ashes falling upon them. As soon as we could move things out of the building, our president and secretary came over with a large wagon and took away those most prized and such as needed more room, to be dried at once, so as to save them if possible.

There is now in the old library the following: Reports of 1866 to 1873, bound in cloth, 134 copies; 1874, paper 1,200; 1875, paper, 75; 1876, paper, 160; 1877, paper, 350; 1878, paper, 130, cloth, 31; 1879, paper, 4, cloth 1; 1880, cloth, 106, 1881, paper, 650, cloth, 432; 1882, paper, 1,077, cloth, 97; 1883, paper, 296, cloth 64; 1884, paper, 383, cloth, 758; 1885, paper, 1,575, cloth, 3; 1886, paper, 460; 1887, 200.

There are some few other odds and ends hardly worth caring for; also some twine and wrapping paper left.

E. A. CUZNER,
Librarian.

The following from Mr. Gibbs, formerly secretary of the Society, was received and placed on file:

NOTES FROM SOUTH DAKOTA.

By Oliver Gibbs Jr., Ramsey, Dak.

S. D. Hillman, Secretary, etc.:

As it is uncertain whether I can attend your annual meeting this year, I will make a few notes as you requested and send them in.

Prof. Keffer, from his observations at the Brookings agricultural college, and at the Dakota horticultural meetings, and from his travels and extensive correspondence, will be likely to give the general news of horticulture in the territory.* I will therefore limit my notes mostly to my own personal work and to what I have learned from my neighbors' gardens.

* Prof. Keffer writes that owing to a press of duties he can not furnish the article promised.—Sec'y.

VEGETABLE GARDEN.

In the vegetable garden I was victimized by one of our Western seed firms whose senior member I had known for merit some years ago in a single specialty, and whom I trusted last year for my entire order of garden seeds. I planted and tilled with the intention of aiding our county fair with a large line of choice and showy products. A pound of "giant" mangel seed yielded two kinds of sugar beets, two kinds of turnip beets, a long blood beet, one or two kinds of globe beets, and not a single mangel wurzel in the lot. A neighbor raised a similar lot from seed obtained from the same firm, and entered them at the county fair as "———— Giant Mangel Wurzels" because the paper of seeds said so, and gave the firm the benefit of the advertising. Of course the judges recognized the joke, and rejected the entry. "Danver's half-long" carrot seed yielded about every sort of carrot except Danver's half-long. Pickling onions were more than half scullions, good large ones. Several other sorts of onion seed might have been true to name, all through, and of fair stock in the days of their youth. I can not speak for the dead seed. The few live ones were all right. A barrel of six kinds of potatoes were all of one sort except a few accidental scatterings of unnamed sorts. And so on —"the cankerings of a calm world and a long peace" served me right; I should have known better than to have bought of a seedsman who attaches his own name to almost every seed in his catalogue and who flames out with gaudy pictures of vegetable impossibilities. Hereafter I want a plain catalogue; and in our local farmers' meeting here, where we discuss such things during the winter months, we will make a black list of seedsmen and — may I be permitted to say it in this presence — of nurserymen who cheat us.

Of several sorts I save my own seeds. Excelsior watermelon, of successive years' selection, mixed with the Stokes, still heads my list for size and quality, productiveness and earliness; planted the middle of May, they commence ripening not later than the twentieth of August, average about twenty pounds weight, and yield many above thirty pounds. We never get a poor Excelsior melon; they continue ripening till frost comes, and are good keepers. The Stokes is not equaled for quality when the season is favorable for its growth, and is fairly productive. The cross between these two, I spoke of last year,

bred back into a long-necked mongrel, and was discarded. Another cross between Miller's Cream Nutmeg and Bird Cantaloupe also bred back to both sides with the virtues of neither parents and faults that neither had. I am now bred entirely out of a good muskmelon. What shall I try next? Someone tell me.

The William Hurst pea, seed originally from Gregory, is all we want for an early sort. With my other purchased seeds I received a lot ordered for and labeled "Champion of England." They were not champion of anything whatever. Does any seedsman preserve this old king of the late peas? I have not been able to get it for many years.

SMALL FRUITS.

I have found, as yet, no strawberry quite suited to this soil and climate except the Crescent, though Glendale does fairly well; shall discard Sharpless, Jewell, Parry and Warren, have ordered Wilson, Gaudy, Jessie, Bubach, and Monmouth. Lucretia Dewberry wintered well but bore no fruit, probably uncovered too early. Grapes, the few found in the garden when I came here, bore well and ripened before the frost of September 10th. My first planting of grapes was last spring. Out of sixty-five vines, partly from Mr. Latham and the rest from the Minnesota Experimental Farm, all lived and grew well but three. In the lot are Moore's Early, Worden, Concord, Delaware, Niagara, Pocklington, Brighton, Janesville, Wilder, Agawam, Ives, Hartford, and Rogers 9. Will watch their foliage and general habits carefully and report. We have a great study here in Dakota to find out what sorts of plants are adapted to our climate. My place is too much the headquarters for birds to do anything with raspberries till this fruit becomes more common in farmers' gardens.

FLOWERS.

In the flower garden we have good success, and it goes a long way to make us contented in Dakota. In the centre of the plat, a little bench garden devoted exclusively to flowers, we have a wild grape trained over a cheap arbor of poles and crotches, under which a dozen persons can be comfortably seated, and the foliage so dense over head that the brown thrushes often chirrup and eat their grapes there while we are sitting beneath, and it is but three years since we put the arbor up. The young shoots hang pendant on the sides, and some of them are taking fresh

root. I speak of this because it is so easy a thing for anyone to have in the flower garden for a retreat and resting place where one, or two, or the family, or a social group of visitors, can repose in refreshing shade, and enjoy the odors of flowers, the beauty of form and color all around, the music and motion of the flitting birds, the hum of insects, and all the associations that make flowers agreeable. This arbor I call my private office. I fancy there is no plant for an arbor equal to the wild grape. The air beneath its shade seems fresher, to more "nimbly and sweetly recommend itself" through the grape foliage than through other vines; like that where the "temple-haunting martlet at Macbeth's castle decorated each jutting freize and buttress with his loved mansionry because the air smelled wooingly at Inverness."

We have been much interested during the past dry summer in noting the differences among the flowering plants and shrubs in their apparent capacity to resist the drought. Some seem to care nothing about it. Others wince a little but stand it. Still others give up. Among the shrubs the strongest are the Tartarian honeysuckles and the lilacs. Next are the Hydrangea grandifloris, the syringas, the wisterias, the clematis vitalba (virgin's bower). The weakest are the spireas. We let our snowballs bloom too heavy the first season of their budding, and they are weak in consequence. Others leave them in good growth. The wild shrubs and small trees, as the grape, the bittersweet, the ampelopsis, the scarlet thorn, the shepherdie, the wahoo, the Juneberry, the sand cherry, etc., are independent of drought. The boursoult climber, the blush and the Princess Adelaide moss are the strongest of the roses in a dry season; next are the glory of mosses, the Countess de Murinois, the black rose, and the damask; the weakest are the Scotch. Of the annuals, the portulacca is queen of the desert. We often wonder why this flower is so little appreciated. We fringe the front slope of our garden with a long bed of it. Keep it clean of any weeds by hand picking, and it seeds itself from year to year and covers the slope with brilliant many colored bloom all summer, and the dryer the weather is the better. It likes heavy fertilizing, yet is thrifty under neglect. In thinning out the volunteer plants, the colors of the bloom can be distinguished by the shade of the plant itself, so that a mixing of colors can be regulated to suit one's fancy.

Next in drought resisting powers are the petunias, the phlox

Drummondis, the nasturtiums, the four o'clocks, and the Schizanthus Centranthus, Vicaria, Antirrherium, bartonia, pyrethrum, Verbenas and all the pinks. Pansies drooped, asters quit, Zinnias, candytufts, marygolds and many others of unknown names, from papers of mixed seeds, withered badly. We tried to get the scarlet lobelia, but received the blue instead, as we did several other uncertain sorts of flowers from the same seedsman who partly wasted a summer's work for us in the vegetable garden. The blue home proved to be a good little rustler and bloomed in a nice border at our feet by the arbor all summer. Gladiolus made moderate blooms.

THE ORCHARD.

There is nothing to say under this head except that everything did so well since the trying year when they were first planted, I can not tell yet what varieties are hardiest. All the weak trees were cut back the second spring, and most of them made new stems and have since done well. All are too young to have the blight. I was greatly encouraged last spring, after we had such long continued and severe cold weather, and scarcely any protection from snow in my wind-swept orchard, to find no traces of winter-killing whatever. The Leinherting and Bessemianka pears, the Maldaoski and Arab plums, the Ostheim and Riga cherries, came out as fresh and vigorous as the wild brush.

WILD PLUMS.

No fruit last year—first failure since the country was settled, so say the old settlers. I find so much variation in the fruit, due to intermixing of pollen, and some other causes perhaps not so well understood, that to protect myself from being advertised as a frand by people who "know not Joseph," or the nature of the wild plum, I am declining all applications for cions, except from the official experimental stations, but shall save the pits of my best fruit the next time I have a crop, and send there instead. People will then know they have to take their chances. But I am cutting down all groves of inferior sorts.

THE SAND CHERRY.

I find this germinates readily from spring planting of the pits. We have an increasing number of reports of its behavior under

domestication. It is growing in popularity. H. C. Warner, of Forestburg, one of our best posted and most reliable authorities in Dakota horticulture, says, that for cooking purposes it is equal to the early Richmond, and that the yellow variety is more globular in form and of better quality than the others. Nurserymen do not seem to have it in stock as yet, but every cherry that shows itself next summer in the markets of the towns will be saved for seed.

THE SHEPHERDIE.

Small sprouts dug up in my pasture a year ago last spring and set out in the garden are now seven feet high and loaded with fruit buds. In the wilds the trees look scrawny. In the garden, straight and symmetrical—a handsome ornamental tree in every way. Has anyone yet learned how to germinate the seeds? A friend of mine tried the scheme of fermenting them in the body of a hen, shut up for the purpose, but lost the seeds before the planting season, by some neglect.

May you all have a pleasant annual meeting.

RAMSEY, McCook county, South Dakota, Jan. 5, 1889.

HORTICULTURAL INSTITUTES.

Mr. Barrett presented a resolution in reference to the horticultural instruction to be given at farmers' institutes, etc.

Mr. Fuller moved the adoption of the resolution. He said there was great need of educating the people in horticulture; it was useless for a farmer to buy a lot of strawberries when he knew nothing about taking care of them.

Col. Stevens said while he was in favor of the resolution he had doubts as to the propriety of its passage at this time. There were too many interests needing assistance to ask a special appropriation in the interest of horticulture alone. The institute work, under the management of Supt. Gregg, had been a great success, and the subject of horticulture had been well represented as a rule at the meetings, by Mr. Smith, Mr. Harris, Mr. Barrett and others. It was better to continue the present system than to hold separate horticultural institutes. He thought a better attendance would be secured, and more accomplished in the interest of horticulture to conduct the institutes in the manner heretofore pursued.

Mr. Fuller said he was opposed to holding the institutes separately from the agricultural and dairy interests. He did not understand that to be the object.

Mr. Barrett. I was at the farmers' institutes during the summer campaign, and traveled over the Red River valley, where forests are greatly needed. I want to say that in Mr. Gregg I found the right man in the right place, and I do hope that not a word will be dropped here by any member of this Society, that will in any sense conflict with the good work that he is carrying on. I have noticed, however, that there is a lack of interest in horticultural and forestry topics; farmers are all absorbed in the horse; dairy interests and the hog take a prominent place. Mr. Gregg allowed me to wedge in here and there some talk on horticulture, but from necessity it was limited, seldom more than twenty or thirty minutes; in some localities the subject was not mentioned. Under such circumstances ought we not to do something? We have been tinkering away to induce people to plant forests. But they have wheat on the brain. We must compel the people to come in. I used to entertain the idea that men could save themselves, but I have about come to a different conclusion. We must have line upon line, precept upon precept.

Mr. Pearse. I have been with Mr. Gregg over the southern part of the state. I have found usually at these institutes twenty-five or thirty persons that were deeply interested in horticulture, but other topics took up most of the time—the cow and the horse. They were the leading subjects of the day. If we got in half an hour on horticulture in a three days' session we did remarkably well. I have found it the best plan to get those interested into a separate room and give them instruction. They then went away perfectly satisfied.

A portion of this appropriation belongs to the Society just as it belongs to any other interest. If there is any business that ought to be attended to it is that of planting trees on our Western prairies. There are thousands of acres there that will have to be planted to trees. All those people there should be taught how to grow evergreens. The State of Minnesota could well afford to expend $100,000 to plant evergreens in that section of the country; it would be worth millions to them. Why should we hesitate in urging such a worthy cause? Those people are, many of them, as good people as there are in Minnesota; they are Eastern people; they are educated; they are ladies and gentle-

men. Do you want to deprive them of these blessings which are in our power to bestow upon them?

Mr. Allyn thought if "the cream and the horse" were taken from the farm there would be very little left. It was where people gave most attention to the pig and the horse that horticulture was coming forward — in other words, the luxuries of life. If farmers would continue to prosper they must have the cow; thousands were needed where very few were now to be found. There was no industry in the state so important as the live stock industry. A farmer planting the strawberries might get something and he might not. Prof. Gregg was doing a work that the state had need to be proud of. Too much was said on this fruit question and too little on that of vegetables. He had been here now three days and hadn't had a chance to put even a beet into the department. (Laughter).

Mr. Pearse. Mr. Gregg is a first-class man; I esteem him highly. I will give him all the time; but I will take my dozen men and women and go into a separate room with them, to teach horticulture. I have done it time and again and it interferes with nobody.

Mr. Barrett. The idea that we horticulturists are opposed to the cow, the hog and the horse is ridiculous, it seems to me. We are as earnest as anybody else. Take, for instance, the subject of forestry; how can you make the improvements you require in regard to your stock unless you have forests? The people up north are wide awake for improved stock, but they neglect the forest. You can't very well dove-tail this in with farmers' institutes and do the subject full justice.

REMARKS OF MR. SMITH.

Mr. Smith. Mr. President, I think there is some misunderstanding as to this question. I am in sympathy with the object presented in the resolution. I have attended many institutes, and I have urged the horticultural part of the work with all the ability I could bring to bear upon the question. It has not received that share of attention that I thought the subject deserved, but I fail to see wherein the resolution offered would help the matter particularly. If horticulture has not received its fair share of time in the work of the institute it has been largely the fault of horticulturists themselves. It is true the farmers do not show that degree of interest in horticulture they ought to, and as Mr. Barrett says, they give more attention to the talk about the horse, the cow and the pig.

The institute work under Prof. Gregg has been a sort of an experiment. While he has aimed to give careful and detailed instruction in the subjects brought upon the platform, he has always kept in mind the popularity of the work. And he has honestly and earnestly believed that the people did not want the horticultural instruction as much as they wanted the horse and cow and pig talks; and he has been inclined to give them what they wanted, perhaps, rather than what they needed.

We do not know as yet how the board may be organized, or whether we will have any appropriation or not; but we do not want any misunderstanding as to the use of that appropriation or the management of the institutes. I believe that if the Minnesota Horticultural Society, through its executive committee, or through the leading members of the Society would ask and insist, as they have the right to do, and will have opportunity to do, that a certain share of the time of each institute be given to the discussion of these subjects, that it will be given by the superintendant, whoever he may be, whether Mr. Gregg, or somebody else. The reason why this has not been done before is, perhaps, because of the indifference of horticulturists themselves.

In my own talks at these institutes I have always been very conservative, and very careful in regard to statements that I I would make; and I am satisfied that I would have been given more opportunity to talk on horticultural subjects, and the work would have had more prominence than it has had, if it had not been for the severe criticism of members of this Society.

If this Society will agree in regard to the amount of instruction and present it to the institute board, or whoever shall have the management of the work, I believe they will receive what they ask. It would certainly be unfortunate at this time to pass any resolution asking for any division of this fund. to any special interest. The same thing might be urged by the dairymen, by the poultry men, or the amber cane interest, that each should be allowed their certain part of this money.

In regard to the matter of time. I started out with the idea that if I was going to tell a man how to grow strawberries I wanted an hour and a half; but I was so drilled in this work that I have been able to impart in ten minutes more information to farmers in regard to how to plant and grow strawberries than I could do before in an hour and a half. I think this has been one of the mistakes, that sometimes the horticultural part of the

work has been drawn out so long that people lost their interest in it and in some instances would go away from the hall and didn't give it that attention that it deserved; and so Mr. Gregg would bring on the horse, the cow, or something that would hold the attention of the people.

Mr. Pearse struck the key note when he spoke about going into another room to teach horticulture. During the last eight weeks of last winter's course, at least one hour was given at each institute to this class of work and we found it very profitable. In these horticultural classes there would be perhaps from ten to thirty-five persons present, interested in horticulture. I finally brought Mr. Gregg to believe, as I did, that there ought to be ten or fifteen minutes given to present the claims of horticulture during the large attendance, and then allow those who were impressed with these claims and with the questions expressed upon them, to gather in the class room and receive instruction that proved very acceptable.

I think instead of this resolution we need an agreement in regard to the amount or kind of horticultural instruction this Society wants given; let that be given on any particular day, and let the balance of the horticultural instruction be given in class rooms, as suggested by Mr. Pearse.

I certainly hope there will be no division of this fund, or any interference with the powers of the superintendent; because I believe the superintendent ought to be untrameled in his work.

President Elliot. This is a very important subject and I thought at the time it was introduced the proper way to dispose of it was to put it in the hands of a committee and let them go to work and see what was the best to do. I wish to say a word in regard to a remark of Mr. Smith about some of the officers of this Society having criticised the work that was being done in the institutes, and that we were not giving it our hearty support. Perhaps there are other members in the Society that have thought more and done more, and have put in more time thinking over it than I have, as an executive officer. But whenever I have seen Mr. Gregg and had a chance to talk with him, I have always brought up the horticultural part of the institute work. We have talked it over time in and time out. He was not satisfied with the work as it was being conducted; this year it has been experimental work. He was feeling his way. Last year we had any amount of opposition in getting a small appropriation and the idea has been to carry the work along and please the people,

not so much to give them the instruction needed, but in the first place to win them over; this I think he has effectually done. We are on just the right ground to-day to claim our rights; and now I think we can make our requests of the superintendent and get whatever is rightly due us.

Mr. Ridout. I think if we hold on in this line and do not separate into two institutions that we will get our rights.

Mr. Cutler. I had wished to say a few words, but Mr. Smith stole all my thunder. I am in favor of special sessions being given to horticulture during the holding of institutes.

President Elliot. I think if we will explain to the superintendent the situation and what is desired we will get just what we want.

Mr. Cutler. Furthermore, I think the selection of horticultural instructors should be left with the executive committee of the State Horticultural Society.

On motion of Mr. Wilcox the following committee was then appointed to confer in regard to this matter, to-wit: Messrs. Wilcox, Barrett and Stevens.

The committee subsequently reported the following preamble and resolutions, which were unanimously adopted:

WHEREAS, The farmers' institutes, under the superintendence of O. C. Gregg, have prove to be the most efficient method yet devised by which to induce improvements in breeds, condition of stock and in the dairy interests; and

WHEREAS, The horticultural interests, being correlated with the agricultural, are of equal importance, therefore

Resolved, That this Society recommends and urges that a large portion of the time in the farmers' institutes be employed in horticultural instruction, leaving to the superintendent the right of arranging the same as will best subserve the success of the work.

Resolved, That the objects to be attained are to teach in the farmers' institutes all the essential branches of horticultural industry, to organize county societies, as auxiliaries to this, and by every means possible pave the way for the building up of forestry wherewith to mitigate the rigors of our climate and thereby secure better protection to our farming industries, and for the growing of all fruit plants indigenous to the Northwest.

The following report was read by Mr. Dartt, with reference to the Owatonna experiment station:

OWATONNA EXPERIMENTAL TREE STATION.

By Supt. E. H. S. Dartt.

Mr. President and Members:

The progress of this station, though not rapid, has been substantial during the past year. The amount of $700 was appropriated for its use, $500 being for salary and $200 for expenses. It was found necessary to erect a small building for shelter, storage and general use, at a cost of $150. This left but $50 for the purchase of stock and all other expenses. But to help out in finances the state school board paid for a bill of young trees, about 2,200 in number, mostly evergreens, and costing about $100, on condition that they should be grown to transplanting size without expense to them. This gave more work to do and added materially to the appearance of the grounds. At the close of the year, April 1st, I shall have expended about $100 in excess of the appropriation. It will be seen that about $400 has been expended during the year, besides my own labor, and in view of contemplated improvements about that amount will be necessary for another year.

During last winter letters were sent to our leading nurserymen asking them to send scions of new and promising varieties for trial. Most of them responded liberally and some sent young trees in the spring. The scions thus obtained, with those cut on our own grounds, enabled us to graft about one hundred varieties. Nearly all of these have made a fair growth and some of them will evidently take a high position on the perfected fruit list of Minnesota. The persons to whom our Society is under the greatest obligations for these favors are Prof. E. D. Porter, A. W. Sias, M. Pearse and O. M. Lord, of our own state, F. K. Phoenix and J. C. Plumb, of Wisconsin, and C. G. Patton, of Iowa. I received about one hundred and fifty varieties of Russian apple trees from Prof. Porter, all of which are alive, and though there seems to be quite a difference in vitality, yet I think it premature to report on indications of hardiness since there are four or five other requirements besides hardiness, a lack of any one of which makes the tree of little value. It is generally conceded that though a seedling apple tree may be found to possess all the valuable points as an original tree, yet when the variety

is grafted, grown in nursery, and transplanted to orchard, it is quite likely to be found deficient in some one or more of these essential requirements. If this is true and we let a seedling tree take its natural course, it must stand at least ten years in its original position to prove its value as an original tree; then we must graft it and wait another like period to test it in orchard as a root grafted tree. A very long time to wait for those of us who are old. But to cut this time down to its shortest limit we will cut scions from our most promising three year old seedling trees and graft them. Then by the time the original tree begins to bear the grafted tree will be of bearing size. We will also make root cuttings from some of the original trees and grow trees in this way, believing that if our method of propagation by root grafting is defective, this method of growing trees from root cuttings will cure that defect. We will top graft the sooner to get fruit and to compare this with other methods of propagation. In this way we can test a seedling variety fairly well in ten to fifteen years and get strong indications in much less time. And if a variety proves really valuable there will be sufficient stock to make it available for public use in a short time.

In this connection it may be stated that twenty-seven varieties of seedlings from a seedling of the Tetofsky have been grafted. What the fruit of this third generation will be no one can tell. But the Tetofsky is almost hardy enough for Minnesota, and if each generation adds a little in this direction, to use a now common expression, we will soon get there.

At our last state fair Mr. A. G. Tuttle, of Baraboo, Wisconsin, made one of the finest displays of Russian apples ever seen in the Northwest and generously donated the most of his collection to the Owatonna station. These apples were grown in an orchard exclusively Russian and the seeds of the most of about sixty varieties have been planted by themselves and so marked that the parentage of seedling grown trees will be known on one side at least. It is expected to find out which varieties reproduce themselves from seed with the greatest precision, if there is a difference, and also the relative hardiness of Russian seedlings as compared with American seedlings. Seeds have been planted of several noted varieties such as Peerless, Okabena, Wealthy, Duchess, and others. Also a lot from Thompson's seedling orchard in Iowa. But perhaps the fewest seeds with the biggest pedigree are from J. S. Harris, who sent seeds last week of Klein's seedling, and says the grandmother tree is living in Canada and has born apples for more than one hundred years.

The Trial Orchard has been started with about one hundred trees, nearly two-thirds of which are mostly common varieties and one-third hybrids set with a view of using them for stocks for top grafting. Ten varieties of plums are on trial as follows: Patton's Native, Rockford, De Soto, Forest Garden, Speer, White Nicholas, Wolf, Black Prune, Owatonna and Rollingstone. The Speer plum looks best among those that have grown two seasons and White Nicholas and Black Prune look the poorest. All these and several other varieties will be placed in orchard next season and Russian cherries and pears will likely receive attention. Owing to the many discouragements in regard to orcharding in our state, I have regarded the apple question as paramount to all others and have given it a large share of my study and labor. And while there appears no reason for a change in this respect, yet forest and ornamental trees must receive more attention in the future.

The Evergreen List contains the following: White Pine, Scotch Pine, Austrian Pine, Corsican Pine, Dwarf Mountain Pine, Norway Spruce, White Spruce, Douglas Spruce, Colorado Blue Spruce, Hemlock Spruce, Balsam Fir, Siberian Fir, American Arborvitæ (White Cedar), Golden Arborvitæ, Pyramidal Arborvitæ, Little Gem Arborvitæ, Silver Tipped Arborvitæ, Siberian Arborvitæ, Red Cedar and Common Juniper. The Douglas Spruce was injured at the snow line but is likely to recover. Golden Arborvitæ is apparently as hardy as the American.

In Deciduous Trees we have on trial, White Ash, Black Cherry, White Elm, English Elm, Scotch Elm, Hackberry, European Alder, Hard Maple, Weir's Cut-leaved Maple, European White Birch, Purple-leaved Birch, European Larch, Russian Mulberry, Downing's Mulberry, Catalpa, Butternut, Black Walnut, Horse Chestnut, Sweet Chestnut, Wisconsin Weeping Willow, Red Willow and ten varieties of Russian Poplars and Willows designated as follows: Populas Petrovsky, 23 Riga, 40 Riga, Populus Laurifolia, Salix Acutifolia, 122 Vor, 123 Vor, 127 Vor, Populus Cetinensis and Populus Fantaga. I have grown some of the Catalpas from seed and though last winter was the coldest we have ever seen, yet the Catalpa stood bravely up and started within a few inches of the tips and one blossomed. We will plant more seeds. The Russian Mulberry frequently kills to the snow line but some of them stood a little above last winter, and we have hopes that it will finally succeed, especially if grown from seeds in our own state. The fruit is said to be so poor that it has no market value.

DISCUSSION.

Col. Stevens inquired if it would not be in order to offer a resolution requesting that the money appropriated by the legislature for the support of the Excelsior experiment station be transferred to that at Owatonna. The Society had received no reports from the former station for some time.

Mr. Pearse inquired if Mr. Gideon was still under pay by the state.

President Elliot stated that he was.

Prof. Porter said that he would like to be heard briefly in regard to the Excelsior station. That station was the creation of this Society; without its aid there never would have been one there; but the condition of things there now was very unsatisfactory. So far as he was concerned and his connection with it, he said he was neither fish, flesh nor fowl, nor even "red herring," and never had been; he had several years ago washed his hands of the whole affair, as far as possible. As the matter now stood, without some additional legislation the Society was powerless, and the board of regents, in whose hands the management of that station was placed, were also powerless. Nothing could be done with reference to it but by legislative action. The bill creating that station was very peculiarly framed. It was well understood the station was created not so much for the purpose of benefiting horticulture in Minnesota as it was to pension off a man who had been devoting twenty-five or thirty years of his life to horticulture and was in embarrassed circumstances, who had introduced the Wealthy apple, and which was a very great acquisition to the pomology of the country. It was no more than proper and right that the Society should recognize the efforts of Mr. Gideon, and the state should, as it were, make a donation to him. That was practically what it amounted to. The older members of the Society of course understand all the details connected with the organization of that station, the pressing of the matter through the legislature, the annual appropriation of $1,000 and the naming of Mr. Gideon as the beneficiary of that appropriation. But there was the point that lead to the embarrassment. In order to make somebody responsible for its management they put it into the hands of the regents of the university and requested the board to purchase this land and equip it. The board did so out of the current expense fund of the university; so it belongs neither to the state nor to the Society,

but to the university; hence it was purchased out of the current expense account of the university. Of course it belongs to the state as all public institutions do, but the governor was requested to appoint Mr. Gideon, and hence he became partially responsible to the governor and partially to the board of regents. Neither one feels like touching the matter, and have not for several years past.

He said when he first took charge of the agricultural department of the university he was informed that the management of that station would be placed under his direction and Mr. Gideon would report to him, but on coming to investigate the matter he found it one of those things that he wanted to keep his fingers off just as long as possible; that if responsible he had no authority in the matter. As responsibility and authority went hand in hand, if he did not have authority he didn't intend to assume responsibility; consequently he had kept entirely aloof from the Minnetonka station. He had endeavored to put Mr. Gideon into harmonious relations with the Society at one time, and some of them would remember the somewhat remarkable love-feast held for his benefit at one of the annual meetings, and it was hoped with all the "hugging and kissing" he might start in anew and the friendship might continue; however, it only lasted about six months, and he had seen no results from that union since! (Laughter).

A year ago, or last spring, this matter had been brought before the board of regents in a decided manner, in order that something might be done, for the reason that Mr. Gideon announced the fact that he was going to leave the place and leave the state. The matter was referred to him by the board to inquire what Mr. Gideon was going to do. He had then written him, stating the circumstances and requesting some definite statement as to his plans and views. Mr. Gideon replied that he would remain in the state during the current season, and that in the fall he expected to close up all of the work that had been commenced in relation to that station; that the seedlings would all be distributed, and the impression was gathered from the letter that there would be a prompt announcement of his resignation made by fall. However, nothing of that kind had been received and no communication whatever from him, so far as he was aware, except he had understood from President Northrop that a report had been received as to the work at the station.

The Society could readily understand that the matter was in a very unsatisfactory condition. He wished something could be done to make the station effective and in that event to have Mr. Gideon continued. He had thought it no more than proper to mention the peculiar relations existing between him and the board of regents.

Mr. Dartt. Mr. Chairman, perhaps I am not the right one to say anything on this question, although I may understand it as well as anybody. If there is dissatisfaction with the work of that station, and Mr. Gideon is not earning his money, and if this law ought to be repealed, if they get some member of the legislature to introduce a bill it will undoubtedly go through; because they say they are rather short for funds down there. And if they can cut off $1,000 without doing any particular harm I think they will be willing; the only thing required to be done will be to start the bill.

In regard to the station I am superintendent of, I may say that I suppose the regents have authority, and may now have the funds with which to support the station. I think that is the understanding at the present time, so that no legislation in thatdirection is necessary.

Prof. Porter said it was proper to make an explanation in regard to that matter. The bill creating the Owatonna station had been passed near the close of the last session of the legislature and after the appropriation bills for the support of the university had been passed. When the requisitions for the annual support of the university were made up it was not known the new station had been contemplated; consequently the amount required for its support was not included in the appropriation. When the bill became a law and the board found themselves charged with the support of the station they were without funds for that purpose. That was the conditions of things. The money that was asked for was required for particular objects that had to be provided for. When the new station was created it was very much like the thirteenth guest that comes in after the pie has been cut, and when they looked for the thirteenth piece it wasn't there. As many of the members knew it became necessary to rely to some extent upon the generosity of a private individual, and the station was started very imperfectly with that aid and some subscriptions added by citizens of Owatonna. When we came to the next year we were in about the same fix. We were charged with the responsibility of the station and were very anx-

ious to assist it. Just about that time the Hatch bill became effective and we received the appropriation from the general government of $15,000. But as the central station had to be equipped and furnished with its buildings, laboratories and machinery, the money was insufficient for the purpose. Desiring to aid the Owatonna station so far as possible the board appropriated $700, although it was found that fully $10,000 would be required to complete the work of equipment begun at the central station. Of course the bulk of expenditures had now been made; the fitting of the station had made very heavy drafts upon the treasury of the university.

Secretary Hillman stated that he had called upon Mr. Gideon this past fall and had been informed that it was the design of Mr. Gideon to make a distribution of the stock on hand and to resign the position of superintendent. He therefore moved that the Society recommend the repeal of the law providing for the support of the Excelsior station.

Col. Stevens said he was opposed to taking such action at present. Mr. Gideon had done a great work for his country. While it was to be regretted that Mr. Gideon had not come forward and helped the Society he thought the state could well afford to give him $1,000 a year during his natural life. They could do that very much better than to appoint fifteen or twenty extra clerks, or assistants, as had been done by the present legislature.

Mr. Cutler thought Mr. Gideon did not need this appropriation. He had sold his farm for a large sum, and had no one but himself to support, and this money might be used for a better purpose, or where it would be of more benefit. If he really needed it he would have no objection to it, but he is now in a condition where he does not need the money.

Mr. Dartt. Mr. President, it occurs to me that if there is a feeling in the direction of this resolution that it would be just a little nicer to offer it as a suggestion and let it go in that way rather than as a recommendation of the Society.

President Elliot. I have listened with a good deal of interest to this discussion, having taken a prominent part in securing the passage of this measure and being a pretty good friend of Mr. Gideon. I hope you won't do anything now that you will regret in the future. While Mr. Gideon is, perhaps, not in full accord with the Society, in his line he may be doing as much as we are. I think we can well afford to allow the appropriation to

stand as it is; but if you are going to change it I would make this suggestion, that we need not do away with the $1,000 entirely, but let us as a Society have it to put into institute instruction. Transfer it in that direction so that we will get the benefit of it. I just merely throw this out as a suggestion.

Mr. Sias. I feel exactly as our chairman does in regard to this. I helped, with others, to obtain this appropriation, and as Mr. Gideon seems to be about ready to resign anyway, and about old enough to die, it seeme to me to be better to wait a short time to see what may happen. (Laughter.)

Col. Stevens said the Society should not lose sight of the fact that Mr. Gideon had originated many valuable seedling apples. He had one superior to Wealthy, the Martha, the Excelsior, or the Gideon. While he is doing this good work he should be encouraged in it. We are getting the benefit of all these hardy apples for our orchards; why not encourage him to keep on?

Mr. Pearse. I think that Mr. Gideon's apples have been overrated and misrepresented altogether. I live three miles from that orchard; I am there frequently. I have examined every variety. Gentlemen, I pretend to be a horticulturist and a fruit grower; Peter M. Gideon hasn't got an apple, except the Wealthy, that I would take under any circumstances, whatever.

Col. Stevens. Are they not just as good as yours?

Mr. Pearse. He hasn't a thing that I would take except the Wealthy. That is just the view I take of it; I have had every opportunity to do it and I would not take them. I have never found an apple there but was water-cored, or sour, or of bad quality, small, and all that. His whole secret of success is in "infusing" the crab in the apple; and you will readily imagine what the result will be. This theory is denounced, I think, by every prominent horticulturist in the land. That is his great claim—infusing the hardiness of the crab into the standard apple. The result is he has got it there and the longer it stays there the worse it becomes; the trees are full of blight and the apples amount to nothing. I think Mr. Gideon has been well paid for the Wealthy apple. He has had his living and his support from that, year after year. He has become independent and he has kicked us out; he has kicked everything out, even his own wife, and he stands alone and feels above us; a good deal younger than he used to be, is getting younger every day; is looking for a new wife, I am told! (Laughter.)

Mr. Smith. I don't believe the passage of this resolution would be of any particular credit to this Society. I am aware of the feeling in regard to this matter; but I don't think that we as a Society can afford to take any action in that direction.

Mr. Fuller moved to amend the motion by referring the matter to the legislative committee.

The motion as amended was then adopted.

QUESTION BOX.

The following questions were then read:

"Do you think the twin city press could be an important factor in awakening an interest in the State Horticultural Society, and by advancing their interests forward their own?"

Mr. Dartt suggested the question be passed by.

"Can cranberries be grown without overflow?"

Mr. Pearse. No.

Col. Stevens. Yes; I know they can be grown. Our President himself has taken up the wild cranberry and they have borne without being overflowed at all.

President Elliot. It can be done successfully.

Mr. Wilcox. It seems to me the cranberry ought to have about ten minutes of this Society's time. I would say I have had several acres under cultivation for several years where it was impossible to overflow them and have grown them with absolute success.

Mr. Allyn. In what condition was the soil?

Mr. Wilcox. It was a marshy place away down in old Vermont where they have been cultivating them — not very much cultivating either. The kind of cranberry Col. Stevens refers to is the native wild variety. We have no other variety here, although there are as many varieties as there are of apples, and the best varieties prove very successful under cultivation. There are many advantages in having a location where the bed can be overflowed, but it is not at all essential; their successful culture does not depend upon that requisite.

Mr. Pearse. I live in a section where they grow wild by hundreds of acres, but they never grow them without overflowing from the fact there is an insect that destroys them. They can't be grown successfully in this country without overflowing; I don't know what was done in Vermont.

Col. Stevens. I have known of marshes so situated that it was almost impossible to overflow and yet the cranberries bore every year. I have bought many a barrel of them of the Indians, and used to ship them south.

Mr. Kenney. I have a cranberry marsh that I have cultivated and worked on several years. I find the late frosts are more injurious to the cranberry than insects.

Mr. Smith. Flooding will protect from late frosts and that is the principal advantage derived from it.

"Is there such a red raspberry as New York State?"

Mr. Cutler. A gentleman in our county is advertising a raspberry extensively under that name and selling it in large numbers. It is similar to Philadelphia and I am inclined to think that is the true name of it; the berries are of a very dark purple color. They resemble berries sold through our county years ago under that name, by a rascally agent.

Mrs. Stager. I bought some of those berries because they were highly recommended and when they bore there were very few on a bush, although the agent claimed they produced six quarts to a bush; then the berries were crumby. They wouldn't bear well for me for some reason.

President Elliot. He doesn't sell the secret of production, does he?

Mrs. Stager. No; I asked him how he managed to raise so many and he said he wouldn't tell me.

Mr. Smith. This man is advertising this variety as wonderfully productive. I saw the bushes and berries and I pronounced them Philadelphia. I presume some one had imposed upon him and as he had never seen any raspberries before he supposed they were the best to be found.

"Is there an early blackberry, profitable for cultivation in Minnesota?"

Mr. Harris. Nothing earlier than the Snyder.

Mr. Smith. I have a few of the Wilson and my experience has not been satisfactory. They made a fine growth last year but seemed badly predisposed to blight. I secured five hundred plants on the recommendation of parties in Michigan.

"Is the Manchester a profitable strawberry on clay soil?"

Mr. Harris. No, sir.

Mr. Sias. It has been with me.

Mr. Smith. During our last strawberry season there was one party who brought in some fine Manchesters for a week or more

at the market, which were grown on clay land. They were fine berries and brought a good price.

"Which are the best six hybrid perpetual roses for Minnesota?"

President Elliott called on Mr. Gould to answer the question.

Mr. Gould. To start with that is not an easy question to answer, there are so many tastes to suit. It would be difficult to make up a list of only six varieties. I might want a number of light colored varieties, and again I might think dark roses were better. I can give a list of six or more good ones, representing several shades of color. General Jacqueminot, a variety well known, is a standard rose and suits nearly everybody who use roses for personal ornamentation, because the shade is constant. By some it is esteemed as pretty as any. The bush is hardy and tolerably productive. There are other dark roses just as hardy, among which I would name Fisher Holmes, which I think is prettier than Jacqueminot. The latter is not good as a full blown rose, but rather inferior. Louis Van Houtte is the prettiest shaded of any to my notion. It is rather dwarfed in its habit and does not produce as many blooms as we would like, but is one of the prettiest roses I have seen. Baron de Bonstetten is a hardy rose, and while not as full as I would like, it equals Jacqueminot on my place.

Among the light varieties there are so many it is hard to make a selection. Baronesse Rothschild is one of the hardiest. Mabel Morrison is of white and sometimes of pinkish color. I suppose they are among the hardiest perpetuals. I have only started with a small list but would prefer to hear from others.

Mr. Gould was asked if he knew of any climbers.

Mr. Gourd said he thought the climbing teas were worthless for outdoor culture; it was hard to winter them.

"How and why shall we interest young people in horticulture."

President Elliot. That is a pretty deep subject for the present, till we have more time.

"Arbor Day; what shall be done to increase its popularity and usefulness?"

"How can we increase the yield of potatoes?"

"In what way does it pay to give attention to plants in the house, and are they injurious?"

Prof. Porter. The last part of the question I can answer, that it is not, except in sleeping rooms, with doors shut.

Mr. Perry. May I ask Prof. Porter if that rule holds good with all plants?

Prof. Porter. It does, for the reason that at night when we are generally asleep, the processes of exhalation are changed; during the daytime the plant is absorbing carbonic acid and breathing out oxygen. During the night it is reversing the process; is taking up the oxygen.

"Our timber; shall means be taken to preserve it?"

"Sheep, hogs and other stock in orchards—what is the effect?"

"Place and work of local societies?"

"What inducements have farmers for increasing their apple orchards?"

It being already past the hour of adjournment the Society took a recess till two o'clock P. M.

AFTERNOON SESSION.

THURSDAY JAN. 17, 1889.

The meeting was called to order at two o'clock P. M.

TELEGRAMS RECEIVED.

ST. PAUL, JAN. 17, 1889.

S. D. Hillman, Secretary, etc.:

Owing to my illness during the past week, have been unable to participate in the meetings of the Society, and my physician advises me against going up to-day.

D. A. ROBERTSON.

SPRINGFIELD, ILL., JAN. 17, 1889.

S. D. Hillman, Secretary, etc.:

At the National Dairy Fair Association meeting in this city the following resolution was adopted:

Resolved, That the various county, state and other horticultural societies be invited to make a display on exhibit of their respective state pomological products in conjunction with and at the same time of the holding of the National Dairy Fair Association.

HORACE J. NEWBERRY.
JOHN BOYD.
FRANK D. HOLMES.
Committee.

President Elliot. We have with us this afternoon a gentleman who is secretary of the Central Missouri Horticultural Society, Mr. C. C. Bell, of Booneville, whom I am pleased to introduce.

REMARKS OF MR. BELL.

Mr. President and Members of the Horticultural Society:

I don't know that I can say anything of interest at this time. I am sure I did not come here to make a speech; I have rather an apology to make for being here. I came uninvited and took the liberty of walking right into the hall. I was not aware of this meeting until a short time since and am here by accident to-day. I was appointed by our society as a delegate to attend the meeting of the Iowa State Horticultural Society at Des Moines, which is now in session at that place. But a telegram called me here to attend to some business matters. I want to say that I am not at present engaged in the business of raising fruit, but of shipping it. I ship a great many apples to Minneapolis and St. Paul annually, as well as to other places in your state. When informed by my friends this meeting was in session, I at once made tracks for the hall, and that is how I happen to be here. I will not occupy your time at present further, but will try to be with you this afternoon and to-morrow as much as possible, thanking you kindly for the introduction.

The *ad interim*, or district reports, of the vice presidents being in order, the following were presented:

REPORT FROM FIRST DISTRICT.

By Vice President A. W. Sias, Rochester.

Mr. President, Ladies and Gentlemen:

We shipped quite a quantity of strawberries, raspberries and blackberries, besides several hundred barrels of fine apples from our district the past season, and as there is a reason for all things, please to bear with me while I give one or two why we did not produce more apples. You see we are a very busy, hard-working people, and don't always stop to consider just where we are located on the earth's surface, and many of us had got the impression somehow — can't say just how — that we were located some

distance north of the apple belt, and hence it was useless to try to grow apples. Now, let us see if this is not an unfortunate blunder.

You will all no doubt admit that apples are grown to considerable extent as far north as St. Petersburg, or latitude 60°, and to no considerable extent south of New Orleans, or latitude 30°. Now, this is an approximation of the great apple belt on this continent, and the centre is latitude 45°, or at St. Paul.

Another serious cause of discouragement is, that we are in the habit of ordering more than one-half of the trees we plant from the Middle States. I agree with Edson Gaylord as to the style of planting and pruning trees, viz.: Lean them to the southwest, and see that the heaviest limbs are on the south or southwest side, and then either cultivate often or mulch heavy.

Fruit statistics never come without the asking, and I have been too busy to look up very many, but such as I have I will present:

R. C. Keel, Haverhill, 275 bushels Duchess, 200 bushels Wealthy, 75 bushels Hybrids, 25 bushels of various other sorts, 16,000 quarts of raspberries, 5,000 quarts strawberries, 600 quarts blackberries, 7,230 quarts currants. C. H. Pond, Kasson, 9,000 quarts of blackberries, and a good crop of apples—have not received the amount. Wm. Somerville, Viola, fine crop of fruit (am not in possession of the number of barrels) and took premiums to the amount of $125 last September. Sidney Corp, over 100 bushels of fine apples.

The exhibit before the Southern Minnesota Agricultural Society at Rochester in September was one of the best ever made at our fair.

We find that the most successful fruit growers in this district pasture their orchards with hogs, and have good wind breaks of evergreens, or deciduous trees.

REPORT FROM SECOND DISTRICT.

By Vice President E. H. S. Dartt, Owatonna.

Mr. President:

I had intended to write out a report to be presented here, but understood that papers were not in demand. I thought perhaps it would not be called for and so I have written nothing.

Our spring at Owatonna was remarkably late, wet and cold. We had to mud in everything that we planted, but it was favorable to the starting of trees. The crop of fruit through that section I think was generally fair of the different varieties.

The grape crop, as far as I know, was rather late; too late to ripen the leading varieties. Janesville ripened but was so poor that we concluded at our house that we'd rather buy good grapes than to raise the Janesville.

In regard to the apple crop, there was an abundant bloom and a fair starting of apples; but insects and hard winds diminished the crop wonderfully. Apples ripened later than commonly, so they kept better than usual. I raised two or three hundred bushels of Duchess, and might have raised a good many more only for the depredations of insects.

I think the insect that did the greatest harm is what they call the apple gouger, or the plum curculio; I think the two are very similar; they sting the apples early in the season. Some time along in the fore part of July I examined the apples carefully and found the little egg, which had been laid in the side of the apple, had hatched into a worm which was working its way through the apple at that time. I found some of the worms about the size of a pin, perhaps a sixth of an inch in length. But one had to look pretty sharp to find them. Three or four weeks later I gathered some specimens and thought I would send them to the agricultural college for inspection. But on investigation found the worms were gone.

I intended to spray my trees in the spring, as I had been troubled the same way the year before. I sent to Chicago for a spraying apparatus but it arrived too late. I had hoped that as the crop was light the preceding year there would not be enough insects to go around. I thought the apples would not all get stung, from the fact that a number of my large crab apple trees were full of blossoms. But I regret to say I found there was enough to go all around the whole field, and I found many of the apples had three or four punctures apiece. I have concluded we can not get them thinned out by not raising a crop of apples; we must try something else. I shall try spraying another year.

I don't know as there is anything else that I should take up your time with except to refer to the mistake that was made in electing me one of your vice presidents. One method this Society has adopted for communication with all sections of the state, is

through its vice presidents. They are supposed to be appointed, one from each of the five congressional districts, and required to make an annual report. Now, if there had been no mistake made the vice president from the Second district would have been from Southwestern Minnesota. I don't know whether it was on account of a desire of the Society to honor me that the mistake was made. I presume not; however, I am under obligations for the honor they have conferred upon me for several years past, and do not wish to continue to receive that honor to the detriment of a section of the state that is properly entitled to it. Therefore, while thanking you for former honors, I hope this will be corrected when you make up the list of vice presidents to-day.

REPORT FROM THIRD DISTRICT.

By Vice President M. Cutler, Sumter.

Mr. President, Ladies and Gentlemen:

Interest in small fruit growing is still on the increase in our district. Many of our farmers are trying to raise enough fruits for their families. Still I should like to see more interest taken in them. If we were able to employ a good horticultural lecturer to travel among the farmers and speak on fruit growing, I think it would be of great benefit.

Strawberries were a good crop and brought fair prices. I am trying several new kinds, and find some very promising. Bubach has the strongest looking foliage, and Jessie promises well. I am trying Countess; the vines made a good growth and I look for a good crop the coming season. Through the courtesy of Wm. Lyons I received and set out six plants of his new seedling for trial. They made a good growth of plants with fine dark green foliage. As usual, most of my berries were Crescents.

My red raspberries blighted badly, and I heard complaints from others; wet, hot weather is supposed to have been the cause. Most of my crop of raspberries were Turner's. They were laid down and covered last winter. When we gathered them, those not laid down seemed to be as nice and productive as the others.

Currants were badly blighted. Blackberries were laid down and bore pretty well. Stone's Hardy and Ancient Briton were the only ones in bearing. Some hills of Briton were as heavily loaded with fine fruit as any bushes I ever saw, and I believe they will prove as productive as our enthusiastic Wisconsin friends claim them to be. I obtained about two hundred quarts, and many of them were engaged by customers before they were ripe at a good price, people were so afraid they would not get them.

My greatest need is a blackberry that will ripen two weeks earlier than the Briton and productive enough for profit. One trouble in growing blackberries is the high winds which blow them down and destroy the young growth. To be profitable, stakes and wire must be used, or they must be cut back.

Wild plums and crab apples were a failure, nearly all blighting. Standard apple trees have about all gone to the brush heap, and if there are a few lonely ones left they will soon die of a broken heart. Grape vines were well loaded, but few got ripe.

The crop of potatoes was the best for years. Onions the same. Cabbages good and free from worms. Other vegetables fine.

The display of vegetables at our county fair was large and fine.

There are those among us who are disposed to criticise the management of our fairs. It does us little good to see a big pumpkin or a mammoth squash unless we can learn something of the manner in which it was grown. It does little good to see farmer A's fine horse worth two hundred dollars, or to hear that he obtained fifty bushels of oats per acre, unless we can learn something of his management. Hence there seems to be a demand for more agricultural instruction, and, I might say, less politics, fakirs and fast horses at our fairs. As our fairs are now conducted a single issue of a good agricultural paper, like *Farm Stock and Home*, gives more good practical information than all the fairs in the state.

This should be changed, and when a man makes a fine exhibit he should be required to state how it was obtained. Make of the fairs a school of agricultural information and I have no doubt farmers will take much more interest in them.

There is also a feeling among our farmers that (in view of the fact that the agricultural school recently established is largely under the control of the board of regents of the state university, and that many of the university students come from the farms) they should have a larger representation on the board of regents.

REPORT FROM FOURTH DISTRICT.

By N. J. Stubbs, Long Lake.

The past season has been a very remarkable one in this part of Minnesota, and yet a very successful one for small fruits of all kinds. The spring being so late and cold, when summer came with its copious showers of rain, our fruits matured very rapidly and were quite free from disease, all except grapes, which never do well in a cold, damp, or wet season, as these conditions develop diseases, or delay the maturing of the grape.

In apples there seems to be little progress, or a desire to plant new orchards, as the old trees have about all disappeared; but there have been a good many crab apple trees, such as Whitney, Transcendent and other valuable varieties planted, and there will be more the coming season. The Duchess seems to be our only refuge for a good, early cooking apple.

In raspberries the crop was above the average and prices good, averaging about sixteen cents per quart. For blacks, the Gregg and Souhegan seem to take the lead; the latter being quite early, very prolific and hardy; the former is well known and seems to be the most popular raspberry all over the United States (where berries are grown for market), of any ever introduced, so far as I can judge. In reds, Turner, Marlborough and Cuthbert are planted mostly; for a showy, nice berry that will command a good price and sell quick, the Marlborough has proved to be the best for me. But I find it is very capricious and will not succeed except in certain localities. I think it will do best on clay loam, moderately rich.

In blackberries we are just making a start — not many planted as yet. The Snyder seems to give good satisfaction as it ripens early, so we have no competition from berries shipped in at that time. For late, Stone's Hardy and Ancient Briton take the lead; the former on clay do the best, and the latter on sandy loam succeed remarkably well; they are both quite hardy and of good quality when fully ripe. The habits of their growth are such that it is quite easy to lay them down in the fall for winter protection — much easier than Snyder.

For a trailing blackberry, the Lucretia dewberry, I think, stands superior to any yet introduced; the berries are so large and strong, and the vines so prolific, that they will never disap-

point the amateur if he succeeds in getting the true berry. There have been so many plants sent out that were not the Lucretia that accounts for many failures.

Currants did not do so well as at other times, the wet weather causing the leaves to drop prematurely, so the fruit did not develop or ripen so well as in previous years. The crop was large and prices ran very low, except Fay's, which were wonderful in size and quantity. They brought on the market five dollars per bushel, while others were selling from two dollars and a half to three dollars. I think they are going to be a success, and prices for the plants will be maintained.

In strawberries we had a bountiful crop; season very favorable; prices run very low, so that many have plowed up their strawberry plantations, or let them go. Jessie and Bubach, I think, will prove very fair, but have not tried them long enough yet to give an opinion.

In grapes there has been only one season out of the last twenty so unfavorable. A late, cold spring and a wet season, made the grape crop almost a failure. What grapes were well ripened brought a fair price. Moore's Early, Brighton and Delaware were among the earliest and best. I have not tried any of the newer varieties of grapes, but it seems to me it is doubtful if Nature can ever produce a better variety every way, when it succeeds, than the Delaware.

REPORT FROM FIFTH DISTRICT.

By Vice President G. W. Fuller, Litchfield.

As far as I can learn, apple trees in my section of the state are reduced to the Transcendent with a few Hyslops, Beech's Sweet and Minnesota. But while the last is hardy enough to stand our winters pretty well it produces no fruit to amount to anything. On my grounds were two trees which bore each year a medium crop; a dozen others bore hardly one to each tree, and last spring they were sent to the wood pile and brush heap. My last Duchess was also sent in the same direction and all but two of my Wealthies. These stood on the north side of evergreens, and as they seemed to have some life left, I decided to give them another chance. They tried to grow about a dozen apples between

them, but the effort was too great and they also follow the rest.

My Russian apples obtained from Prof. Budd, have all pretty much failed. But the willows and poplars have done well and promise to be a valuable addition to our forest and ornamental tree list. My two pear trees, grown from scions from Mr. Peterson's best Russians, look well now, but the real test will come after this.

As to fruit, the past season has been quite encouraging. The only apples brought to market were Transcendents; and, while the trees standing bore a fair crop, there were not enough to meet the demand.

The crop of currants promised large the first of the season, but when about full size a large part of them fell off, and not a third of a crop was gathered. I think it was a few days of hot sun and dry wind that caused this. Gooseberries bore a full crop; also the red raspberry. Strawberries also did well where proper attention was given them. But so many fail to give the proper attention, and hence are disappointed in the results.

I think harm is done unintentionally, perhaps, by statements so often made that these small fruits can be grown so very easily, and with such large profits. "No excellence without labor" is true here as elsewhere. The strawberry bed must be kept clean and rich, and the vines covered in winter, and well mulched in summer, or berries will be small and few of them. And very few, doing the best they can will realize one hundred bushels per acre, to say nothing about three and four hundred, so often promised them.

But here, in my opinion, is our real field of labor, as fruit growers. I have given up trying to grow apples in our part of the state, except the very hardiest crabs — I might almost say — except the Transcendent. But there is no reason why we may not have an abundance of currants, gooseberries, raspberries, and strawberries, together with our native plums, except the ignorance and neglect of the people themselves. But these difficulties will gradually be removed by suitable instruction and experience gained. We have much to encourage us in this direction.

Mr. Reeves. There are two or three things I would like to speak of. Inquiry has been made as to a remedy for white grubs. I let the moles work in the ground, and would not let them be destroyed. The common mole will destroy the white grub. Another matter: I would like to ask Mr. Dartt if he can kill those in-

sects or prevent their ravages by spraying when the insects simply dispose of their egg on the side of the apples and do not live in the foliage of the plant? How will the poison reach them?

Mr. Dartt. I think the theory is to apply the poison to the insect that punctures the apple and lays the egg; that is, to spray the trees with a solution of Paris green, or London purple. Experimenters have found that applying too strong a solution injures the leaves, but if applied reasonably strong it does no injury to the trees while destroying the insects. They use one or two sprayings early in the season while the apples are very small, using the poison in such small quantities the rain will wash it off without injury to fruit. The reports seem to indicate that it can be made very effectual for the purpose desired.

The subject of small fruits was taken up and the discussion opened by Mr. Wilcox.

THE CULTURE OF SMALL FRUITS.

By L. H. Wilcox, Hastings.

Mr. Chairman:

Recognizing the entire impossibility for me to review this subject in a paper and to present the same in the short space of time to be given I shall speak very briefly upon a few subjects connected with this branch of pomology. It is a subject deserving of the most thorough attention and one which with the most careful condensation, to present it properly, would require at least a hundred pages of your reports, to do it anything like adequate justice.

The culture of small fruits is one of the most if not the most important object requiring the consideration of this Society and so, instead of presenting a paper I will open the dicussion with a little talk, a few unstudied thoughts, suggestive of ideas to other minds, or, as you might say, take a little ramble through the fields of horticulture, plucking a flower here or trampling on a stray weed, a false theory there, and perhaps taking a whack at gregarious grubs and festive worms, that cross my path.

All of us have at least two volumes in horticulture, one of which is a large and nicely bound volume, imposing and magnificent, with a title page full of fine spun theories, setting forth

grand ideas. It contains glowing descriptions of results with seedlings, or with Russian apples. It tells us how to conduct the growing of the Sharpless strawberry and other monstrosities through all the dangers that beset them. It tells us of the vast profits attained in the horticultural field, of immense yields, hundreds and hundreds of bushels to the acre, and of the wealth that must result from engaging in any horticultural enterprise.

Now, gentlemen, that volume of my experience is full from title page to finis, and closed, and I don't propose to open it, for the reason that you can find extracts from it in all of our horticultural reports, and the catalogues of the nurserymen are constructed from it, and you will find its influence in all our horticultural literature. It is the volume that is most popular, as well as entertaining.

The other volume is so small that one could carry it in his vest pocket, and contains a few plain words and actual facts derived from experience.

It has been proven by experience among all practical horticulturists that certain of our small fruits, and those of great value, are peculiarly adapted to the soil and climate of Minnesota. Of these the strawberry, and raspberry, the blackberry and grape, are perhaps the most important. Their culture not only adds to our commercial prosperity but to the attractiveness of homes and the pleasures of every day life. The demand is constantly growing for this class of fruit and I think that where interest is developed in the culture of small fruits it becomes a centre of distribution and the demand grows much faster than the increase in cultivation, and for that reason it becomes of more and more importance every year. Later on I may allude briefly to what it has done for the prosperity of certain localities.

But there is one thing in reference to the culture of all our fruits that I am quite sick of considering; and that is in trying to use and adopt fruits whose only recommendation is their hardiness. I have no faith in so-called hardy fruits, especially for this climate, whether it be large or small, but particularly in the small fruits. I have no faith in fruits that are claimed to be so hardy they will support themselves without the protection which every successful cultivator must give them. The most tender variety of blackberries, strawberries or raspberries, will, with proper care and protection, succeed better than the most hardy on our lists with neglect.

One of the most pernicious features of this branch has been that people — reading from their large volume, see a statement, for instance, that Mr. So & So, of Connecticut, or this or the other man, has raised hundreds of bushels of strawberries, or how they produce $1,200 or $1,500 worth of small fruits to the acre, and they proceed to figure out how much there is in it. They say a hundred acres will produce at that rate so much. And so they proceed to set the hundred acres and calculate they are to get $120,000. It is a delusion and a snare. I had a friend in Southern Illinois, who undertook to set one hundred acres in strawberries, and succeeded in setting out seventy-five. But he didn't keep them but a year or two, and where his $100,000 came in I don't know; I never heard of his having it.

There are certain well known varieties of strawberries that prove such a success it is not necessary to say much about them. I do not believe in going into the cultivation extensively of new and untried varieties which have not been thoroughly approved. If you will go with me to Hastings, upon the brow of a hill overlooking the Mississippi river, I can show you a patch of the Wilson strawberry, which is about four rods square, or one-tenth of an acre; and from that little field was sold this last season over a hundred dollars worth of fruit; nine hundred and thirty quarts. That is high culture and on a small scale. That is no criterion from which to judge of large fields, or for culture for commercial purposes.

The raspberry is usually hardy, though in this climate it is better to give it some winter protection perhaps. While the blackberry and dewberry are always tender, there are no varieties yet developed that are worthy to be called hardy. They should receive all the protection that we can give them, and a covering of earth late in fall is best of all.

Another, and the most important perhaps of all our small fruits, and whose successful growth in Minnesota has been demonstrated, and of all localities, grown in this climate it is of the highest quality, far superior to those grown in vineyards further south, is the grape. It is grown here under favorable conditions to the satisfaction of its growers. Those that are planting suitable varieties and giving them proper cultivation are reaping a bountiful reward. Of the varieties that I might speak of, I will mention the Brighton. Although it is of partial foreign origin, being one-quarter foreign blood and three-quarters Labrusca, it is a variety that will prove of great value

in this state, and in my judgment should stand at the head of all others, at least of the red varieties, in receiving the attention of horticulturists.

Delaware is a little peculiar in its make-up, in its lineage, we would say. It is one-half Æstiralis, or summer grape; one-quarter foreign and one-quarter Labrusca, and has certain peculiarities which have rendered it unsuccessful in some localities. It is now doing better in Southern Minnesota than any other locality, and perhaps is worthy of further cultivation, but its growth should be discouraged in large vineyards except for fruiting. It has a very bad root and other defects which I have not time to speak of.

Lindley is coming forward and gaining in favor every day. It is one of the numerous Rogers hybrids, and except for the fact that it has an imperfect blossom, what we call reflex stamens, would rank at the head of our grapes. But this can be obviated largely by planting it in connection with other perfect flowering varieties. It perhaps would be unnecessary to refer to the well-known Worden, Concord, and Moore's Early. The latter has been overrated, is already losing ground and is being cut down in Michigan, in its rating, from eight to five. Its want of productiveness, and other faults tell largely against it. There are one or two white varieties of comparatively new origin, the Empire State, for instance, claimed to be a Labrusca, but showing unmistakable marks of foreign blood; also the Niagara are promising very well.

Of insect enemies to small fruit to speak in a few moments of time it would be perhaps useless to try to allude to any of them. In our immediate section we have suffered very heavily from the depredations of the white grub this season. And if anybody knows of a remedy that will be effectual, I should like very much to hear it. A French scientist recently reported that he had great success by treating them with benzine. But it is something I know nothing about. Cut worms are not nearly as bad in Minnesota as in some other localities, and the currant worm and raspberry insects are easily managed.

As to the cultivation of small fruits necessary to their success, there is but one point I will speak of and that is the policy of mulching. The best mulching in a blackberry field, or raspberry field, or any other for that matter, during the summer, that I ever saw is thorough surface cultivation; three or four inches of fine, loose soil on the surface, stirred frequently, is as much

better than any mulch as you can imagine. If you don't believe it try it.

Of scientific crossing, or hybridizing, which is necessary to produce the ideal fruit of the future, that does not come practically within the scope of private culture. It should be the work of our experimental stations rather than of private individuals. Hybridizing between species has produced some wonderful results. Cross fertilizing between varieties has produced many varieties that are almost invaluable, and this is a subject that is not receiving one-half, nor an iota of the attention which it deserves, and which it will receive in the future.

The science of pomology is far behind stock breeding in this respect. The laws pertaining to stock breeding are pretty well understood. By the majority of horticulturists who have not made a specialty of the study of the science or art of hybridizing and proper crossing, it is very little understood.

Now, as to what we may reasonably expect from a business standpoint perhaps I should speak for one moment as I have had quite a large experience in commercial growing. It is entirely wrong to create the impression to the grower that he is to receive immense remuneration without exertion. Because he will be disappointed and its effects will last a good while. But we may reasonably expect that a field of strawberries, if properly managed, and with suitable cultivation, will yield 150 to 300 cases of sixteen quarts each per acre.

In the large commercial fields of Southern Illinois and the East it is calculated that strawberries can be produced ready for market in cases and boxes for four cents per quart. Assuming that to be a fact, all that is received net above that price can be regarded as profit. You know as well as I the cost of cultivating, so it will be unnecessary to refer to it.

Raspberries yield less but are more free from insect enemies. Blackberries give about the yield of strawberries; you will never get them quite up to the line of strawberries (and you will probably never get the amount of strawberries you read about), but you may raise two hundred cases per acre in a suitable place.

Blackberries are at the present time almost without insect enemies or parasites. Some kinds suffer slightly from rust, but that is a matter easily managed, and we may look upon them as entirely exempt from casualties.

I don't think I will refer to the management of grapes, currants or gooseberries.

I would like to say with reference to cranberries, since that was taken up this forenoon for a few minutes, that in an extended experience in their cultivation without overflowing, I do not hesitate at all to pronounce it a decided success, for the reason that they are usually grown on land that is of very little value. They require very little attention; you go to very little expense except to wait. And if you secure a crop once in ten years, it will pay for all expense, the value of the land and a good profit besides. But you will not have to wait that length of time to secure a crop. You will get one much oftener than that. The insect that was alluded to is simply a species of the codling moth and easily destroyed. Our climate is perhaps no worse than that of Northern Wisconsin for raising cranberries, and they only succeed in northern localities, thriving well wild in Alaska.

Now, gentlemen, there is one fertilizer that everyone that is engaged in small fruit culture should use and that extensively, and that is a judicious mixture of brains and elbow grease. And it must be used in the field, and manufactured on the spot. It has that peculiarity that it is of little value without it is applied in the field, and applied every day and every hour in the day, from five o'clock in the morning until nine at night during the growing season; in this way it is as efficacious as a patent medicine; it will develop the plants and kill the weeds, it will keep the ground loose and clean and destroy the insects and worms, in short will make a success, when everything else will fail. Try it.

Mr. Urie said he had nine acres of strawberries at one time in Illinois; it was a mistake to say they could be profitably grown at four cents a quart. It could not be done; no matter how large the crop, they could not be handled at that price when cost of picking, expressage, etc., were considered.

Mr. Wilcox said he meant four cents net in the field.

Mr. Pearse said it was a great error to suppose that everybody would succeed in raising strawberries. The enemies of the strawberry were now almost beyond control, at least for the ordinary grower. The ability to succeed depends upon one's skill and judgment, to hold in check the enemies ready to devour the plants as fast as they grow. The leaves becomes diseased; they become covered with spores that grow and feed upon the plants. These spores send out roots and poison the structure of the leaves. For the last few years he had been experimenting somewhat and had adopted a new system. He set his strawberries in

the spring, perhaps five hundred plants, away from the main patch; gave them good cultivation and by the twentieth of July had several thousand young plants entirely free from disease. He plants in rows, six inches apart in the row, and the rows eighteen inches apart. He finishes planting in July, giving good cultivation afterwards. Plants set in July and August will give the finest fruit the following season.

Some varieties are freer from leaf blight than others. For the hardiest of the list he would place Crescent as the best and most productive. Next came Windsor Chief as a favorite variety. Formerly he had recommended setting Crescent in alternate rows with other varieties. He had now discontinued the practice, and sets fertilizing plants in a block or square and was pleased with the results thus obtained.

Five minute papers on vegetables being called for, Mr. Allyn addressed the Society.

GROWING OF VEGETABLES.

By Joshua Allyn, Red Wing.

Mr. President, Ladies and Gentlemen:

I came here in the interest of the vegetable department. That is my business. I expected to hear from the market gardeners and to receive much information. I regard the market gardener as a man who should hold his head pretty high, but of course he should do it reverently. If we have anything of value to others we should be willing to communicate the information that others may receive the benefit therefrom.

THE HUBBARD SQUASH.

According to my observation the Hubbard squash is badly handled. They are often mixed with other varieties. There is no other variety in my estimation that equals the Hubbard. I have tried to keep them pure, and it is done by care in saving the seeds.

The genuine Hubbard squash, if well ripened, will keep well, if put in a proper place. They should be grown on warm, deep, rich soil. A sidehill is to be preferred. The seed should be

well matured. They should be thoroughly dried. They will keep for several years.

Gather your squashes just before frost and let them lie a few days to become thoroughly dry, then store in a cool place. Handle as little as possible. Do not allow them to lie on the ground; you can keep them till February. They bring good prices and are a very profitable crop for farmers to raise, and then it is so much easier to raise them than your Russian apples; more certain every time.

The yield per acre depends of course upon the character of the soil and how highly fertilized. On a light sandy soil, the more it is manured the better. I use a compost in the hills to make them come forward rapidly. I have raised nearly twenty tons to the acre, but six or seven tons of marketable squashes is a fair crop. I plant in rows ten feet apart each way and leave only two healthy plants to a hill.

Col. Stevens inquired if he experienced any trouble with the common striped bug.

Mr. Allyn replied that he had and it was a difficult matter to kill them. He had a remedy that proved very effectual. It was to use air-slacked. It should be applied as soon as the bugs make their first appearance, but not too freely, or when the vines are wet. Soot was very good and might be used in larger quantities; a handful to a hill. He preferred the lime. As soon as he commenced using it pretty freely the bugs would disappear.

Mr. Underwood inquired how it would do to put up a sign that there was lime on the place.

Mr. Allyn said the bugs might not understand English.

Mr. Ridout inquired if it was advisable to prune vines planted on sod, or to remove the first sets. Cucumbers, it is said, are more productive if treated in this way.

Mr. Allyn said he had never found any advantage to result from trimming. He usually let them take their own course and gave them plenty of room.

Mr. Allyn said he would like to say a word as to starting seeds in the spring. It is earliness we are after. We don't want products sent here from a distance when he can raise them at home. We want to keep our money here. It is important to start our vegetables as early as we can. I take leaf mold; you all know what it is. I use a box about four inches deep and sprinkle leaf mold in the bottom with sufficient dirt and plant the seed, such as radishes, onions, cabbage, lettuce, etc. Seeds

can be started in this manner and transplanted when the weather is suitable and thus gain a week or more. He had also used Meadow moss with good results.

EARLY POTATOES.

I shall have to ask for a little time to speak on this subject. It is necessary to make an impression if there is any benefit derived from what is said. I will therefore relate a story. (Laughter.)

Mr Allyn here told an anecdote of a man who was perishing in a blizzard and whose life was saved by his fellow traveler who used such rough treatment as to arouse the anger of the man who was about to perish with the cold.

For one of the earliest varieties of potatoes he would choose Ohio. About the middle of March cut them with a knife, leaving two eyes to a piece. They are placed in the hot-house and half an inch of dirt spread over them. In a short time the roots will be two or three inches long. As soon as the weather is suitable they should be taken outside and planted. When the ground is prepared take them in baskets, roots and all, to the field; as one drops them another follows and covers them. If there is danger of heavy frost after the potatoes are above ground, take the shovel plow and cover them up. You can't keep doing that all summer, but if treated in this manner, as described, they will be two to three weeks earlier than by the ordinary method of planting. In this way you get control of the market and you can readily get two dollars a bushels for the crop. By the time farmers come in with their potatoes you can put them down to a dollar.

Mr. Underwood. How do you hold them back?

Mr. Allyn. You can hold them back if you are careful. If you have no hothouse to start them in you can start them in your kitchen, and beat your neighbors. Most people who fail with potatoes do so because they don't plant early enough; they delay too long. If potatoes are sprouted and have lost half their vitality they are not fit to plant, and if planted too late are apt to be spoiled by dry weather. Have your potatoes cut a couple of weeks before planting and as soon as they send out a few vigorous sprouts, plant them. Cover four to five inches deep in good soil and give good cultivation during the season.

Prof. Porter. I want to take a little space in the report for a subject that ought to have some interest. A great many inquiries have come to the station from different portions of the country with regard to the value of the sugar beet. Two years ago, in order to be able to answer these inquiries, we imported from Paris thirteen varieties of their most celebrated strains of seeds that were to be found in either Germany or France, for the production of sugar. We planted them and the results are given in one of the bulletins you have already received. I have just received from the chemist an analysis made from these thirteen varieties placed under different conditions of growth, on natural soil, on soil fertilized with different compounds, etc.

When they first commenced the development of the sugar beet in Europe they got 1 per cent of sugar, and it took 100 years to bring it up to 6 per cent. In 150 years the maximum was 15 per cent, running down to 9, 10, and 11 per cent.

I will not take up your time only just to refer to the result of this experimental work. So far as the yield is concerned we have grown beets at the rate of thirty tons per acre; this year we have run down to fifteen tons, but the soil was not fertilized. The average per cent of sugar, as shown by the tests made, was over twelve per cent.

Mr. Underwood. What do you recommend them for?

Prof. Porter. For sugar making or for stock.

Mr. Underwood. What is the comparative value of the beet and the carrot for stock?

Prof. Porter. There is more sugar in the beet but less of albuminoids. But all this information will be found in the next bulletin, to be issued in time for the spring planting.

Mr. Ridout. The plan of sprouting potatoes in a hothouse is all right in certain cases. I generally set my potatoes in frames, one frame above another, behind the kitchen stove. I can start potatoes enough very readily to set out a quarter of an acre. I have a seedling that is two weeks earlier than Early Ohio; I raised 160 bushels of potatoes on 38 rods of ground, or at the rate of 673 bushels per acre. I have been growing them four years. I have a sample of them here.

Mr. Dartt. Mr. President, the thought came into my mind that if it were possible to keep the potato over the whole season, so they would be good the second year it would some times be a grand thing; especially this year when only worth twenty-five cents. With the right atmosphere it might perhaps be done.

President Elliot. That is one of the lines to be tried by our friend Dartt at the new experimental station at Owatonna.

Mrs. Kennedy. I heard a gentleman say a short time ago that he visited his father in New York state where they had a lot of potatoes that had laid in the cellar for seven years and they were hard yet! (Laughter.)

On motion of Mr. Cutler, the Society proceeded to the annual election of officers for the ensusing year.

ANNUAL ELECTION OF OFFICERS.

The following list of officers were duly elected:

President—Wyman Elliot, Minneapolis.

Vice Presidents—A. W. Sias, Rochester; Alfred Terry, Slayton; M. Cutler, Sumter; M. Pearse, Minneapolis; J. O. Barrett, Browns Valley.

Secretary—S. D. Hillman, Minneapolis.

Treasurer—Ditus Day, Farmington.

Executive Committee—A. W. Latham, chairman, Excelsior; J. S. Harris, La Crescent; J. M. Underwood, Lake City; O. F. Brand, Faribault; L. H. Wilcox, Hastings.

Librarian—E. A. Cuzner, Minneapolis.

Entomologist—Prof. O. W. Oestlund, Minneapolis.

The committee on grape diseases presented the following:

GRAPE DISEASES.

By J. S. Harris, La Crescent.

Of late years grape growers of Minnesota are beginning to meet with greater difficulties in the way of growing this most valuable fruit than did the old pioneers who demonstrated to a certainty that our soil and climate in the earlier years of this industry possessed in a high degree the most essential properties to fully develop the very best qualities of every variety that was early enough to mature in this latitude. Formerly our vines were absolutely free from every form of disease as well as the depredations of noxious insects. The latter we expected would in the course of time make their appearance, as it seems to be the law of nature that insects follow upon the track of every species of fruit tree and plant, as soon after it has been introduced in new

localities long enough to afford them sustenance; but we had hoped that our climatic conditions were such as would give us immunity from disease.

Our attention is now being called to the fact that a number of diseases of the fruit and vine have made their appearance in different sections of the state, and it is in view of this fact that our Society has created a standing committee on grape diseases. I am not enough of a scientist to enlighten you very much on the subject and my opportunities for study and observation have been limited on account of the pressure of other duties, therefore I will confine myself chiefly to what I have observed at home.

The spring of 1888 was unusually backward; growth commenced late as well as the season of blooming. The setting of fruit was about three weeks later than in 1887. Again the season was charactèrized, especially in this locallity, by heavy and continuous rains, while the spring of 1887 was noted for lack of rain fall and the absence of moisture in the form of dew, and entire freedom from disease.

The first appearance of disease, I noticed in some of the vineyards about Lake Minnetonka, at the time of our summer meeting. Some of the leaves of Concord showed on the upper surface wrinkled spots and a slight change of color and were somewhat curled. At first I thought it might be the work of aphides, but upon examination I detected slight traces of grape mildew (*Pernospora viticulo*); experts say this is always found on the under surface of the leaves commencing in spots of brownish color which adhere closely to the leaf ribs and when the conditions are favorable spreads rapidly and destroys the vitality of the parts affected, causing upon the upper side the appearance of sunscald.

Later I discovered it upon leaves of the wild grapes which are growing abundantly in this vicinity. Some of the cultivated varieties in my own vineyard showed a grayish mildew that not only was of a white velvety appearance in patches on the under side of the leaf, but frequently covered the upper side and the leaf stalk, extending to the fruit stems and the younger growth of the cane. In many instances it was so luxurious on wild grapes as to defoliate them and stop further development of the fruit. This was at about the period of coloring of the fruit; the leaves upon some vines of the Delaware and Agawam commenced dropping before the fruit was fully grown, and in such instances if the fruit did not drop it was worthless, the berries either scalded in the sun or failed to ripen.

About the fifteenth of June there were some indications of dry rot, confined chiefly to Clinton and wild grapes. A small portion of the berries shriveled, turned black, and after a time dropped from the vine. Besides the black or dry rot, there are instances of white rot, brown rot and bitter rot. What I suppose to be the latter form became very serious in many localities last year. It first began to appear about the last week in August. In some clusters one-fifth of the berries were affected by this rot causing the berries to color prematurely, but the pulp remained hard and bitter showing that there had been a cessation of growth. The berries thus affected usually fall to the ground by the time the remainder of the bunch has perfectly ripened, but last year did not do so, as is evidenced by the quality of the fruit placed upon the market. I am informed that this rot and the mildew were so bad in some vineyards that almost none of the fruit matured to a good eating quality. I am strongly inclined to the opinion that the hardiness of our vines depends very much upon their immunity from mildew and that at least some types of the fruit rot have their origin from the same cause.

REMEDIES AND PREVENTURES.

If, as some of the most intelligent vineyardists believe, the mildew was the prime cause of the almost general low quality and unripe condition of Minnesota grapes last season, it has become a grave matter and threatens serious damage to an industry for which we hoped much. In a recent conversation with one of the leading growers of Houston county he made the statement that the foliage was so badly affected by mildew at one period in his vineyard that the fruit, at the time when it should have been ripening, remained about stationary nearly a whole month, and that he did not gather a pound of perfectly ripe fruit. Scores of smaller growers were caught in the same predicament. Investigation has demonstrated to a certainty that the mildew and rot are contagious diseases, or a fungus, that propagate themselves and spread readily from plant to plant by means of spores wherever conditions are favorable.

The free use of sulphur applied to the affected vines with a sulphur bellows has long been in vogue for the destruction of fungus. Some successful vineyardists have kept their vineyards free from rot by picking off every affected grape as soon as it shows it has been attacked by rot or insects, and then destroy-

ing by burning or burying them away from the vineyard. Bagging is highly recommended and considerably practiced. It is a protection against birds as well as insects, and helps somewhat against the mildew, because it keeps the clusters dry, but it is hardly practical for large vineyards.

The commissioner of agriculture in the year 1887, engaged a number of special agents to conduct experiments in the treatment of downy mildew and black rot; at the same time he furnished a formula to all of the leading grape growers throughout the country. The report of the results of the experiments in 1887 has been published in Bulletin No. 5, and doubtless will be furnished to any who apply for it through members of Congress.* The results of the experimenting are really encouraging and later reports from 1888 would indicate that science will soon give the hand of man power to control these destructive maladies. It is probable that the spread of the disease might be arrested very materially by collecting and burning every fall all leaves and prunings, thus destroying myriads of spores that would, under favorable conditions, propagate and spread the disease the following year.

Grape growers are slow to recognize the importance of location. The best site for a grape plantation is where the leaves of the vine will be freest from moisture, from rains or dew; sloping hillsides, contiguous to well defined valleys or near lakes of considerable extent are the best sites for growing healthy vines; upon such places dews are less frequent and dry off sooner than on level lands or in the bottoms of valleys. I do not think it is well to allow wild vines to grow in the near vicinity of the vineyards, and all vines that have from any cause become so worthless that they will be neglected should be rooted out and not left to breed insects and disease.

DISEASES OF THE GRAPE VINE IN MINNESOTA.

By A. W. Latham, Excelsior.

Growers of the vine in Minnesota are fortunate in bright and sunny summer skies and a clear and dry atmosphere in giving them, to a large degree, exemption from the plagues of the vine,

*The brown rot is described on page 50, transactions for 1885, as American grape rot, and differed very materially from that which was prevalant in 1888.

that in so many localities are fatal to success; save under an unusual combination of unfavorable circumstances the cultivated vine in the northwest glows with healthy vigor in leaf, branch and root and matures to the finest perfection a grade of fruit that in quality and appearance ranks at the head of America grapes. The most virulent and fatal of all diseases, the grape rot, is with us comparatively unknown and we are happily free from the anxiety and uncertainty attending the presence of this dread disease in the vineyard. In many localities it makes successful grape growing of any variety a practical failure.

But let not the grower be too boastful; living in this grand and prosperous state, surrounded by a vigorous and healthful air one is apt to think too confidently of his power to succeed and must be reminded that success is not to be attained without constant vigilance and effort.

The diseases that are occasionally encountered here are the Greely rot, the common mildew and the downy mildew.

Of the first of these, the Greely rot, there is little to be said. It is seldom found except upon the Concord and is here described that the grower may satisfy his curiosity as to whether it is in his vineyard. It shows itself upon the fruit after it is turned black and is known by the color of the spot affected, which may cover a third or a quarter of the berry and is of a light unwholesome purple shade. It injures the quality of the berry attacked but is not apparently a disease to be feared. The common or European mildew attacks the fruit and fruit stems of a few varieties, mainly the Rogers hybrids. It appears, as a rule, a few weeks after the fruit is set when the weather is favorable, and covers the parts attacked with a white velvety substance, which under the microscope looks like a miniature forest. If the planter wishes to retain in his vineyard the few kinds that are found to be affected by this disease, the system of pruning and summer pinching should be adopted that does not crowd the wood and leaves upon the trellis, and then by constant watchfulness, and, at its first appearance sprinkling it well with flour of sulphur, it is easily held in check.

The only disease that with us needs serious attention is the downy mildew or American mildew, called by the scholars *Peronospora viticola*. The clearness and dryness of our atmosphere gives us as a rule exemption from this disease, but an occasional season when in the latter part of July or in August the weather has been for a succession of days or weeks hot and changeable,

showers followed by damp, close, muggy air with hot sunshine, followed by more showers, etc., then the conditions are favorable for the spores of this variety of mildew to germinate and take lodgement, or literally to take root upon the under side of the leaves. The varieties of grapes subject to this attack are those whose leaves have a skin and structure delicate and sensitive; those whose leaves have a tougher skin and structure are never attacked except in the neighborhood of a large plot of a variety very seriously affected, and even then no injury is done to them. As a rule the Concord and all its seedlings are exempt from this disease and all the other varieties planted in Minnesota are more or less liable to it. When a block of any variety susceptible to it is attacked, it appears at once over the whole block as though the spores has been dusted upon it at once from an immense dredging box. It appears at first as fine white down upon the under side of the leaves and if the attack is a mild one it will be confined largely to the half grown leaves; if a severe one all leaves are liable to be affected, except perhaps a few of the very smallest. After the spores have found lodgment, they instantly take root and sprout up, a miniature white forest. It usually covers only a portion of the leaf and lies in spots, which do not spread very much. As it grows the roots rapidly permeate the interior of the leaf and eat up its substance. In a few days the white appearance is succeeded by a yellowish tinge and then changes to dark, followed by a drying of that portion of the leaf affected; in many cases the leaves fall, at least their ability to nurture the vine and ripen the fruit is seriously impaired, and the quality of the grape is greatly injured.

Our climate is the great natural safeguard against this disease, but among precautions which experience suggests as reasonable to take against an attack, are locating the vineyard upon high, well drained, yet good, soil, where there is a good circulation of air; spreading the vines well out upon the trellis without crowding; a reasonable amount of summer pinching, not so much as to entirely denude the vine of young leaves, but enough to mature a large number of healthy, well developed leaves; keeping the vines up off the ground and cultivating well. A nursery of young, growing vines is particularly susceptible to this disease, and should not be located near a vineyard. With all these precautions in peculiarly unfavorable seasons the vineyard may not escape, but all things being equal the chances will be better and

the grower will at least have the consolation of havig ndone his duty according to the light possessed.

It would be wise for every grower to get the reports upon this subject, published annually by the agricultural department at Washington. They are conducting officially a very interesting series of investigations into the cause and cure of this kind of mildew, and these reports include also the results of many private investigators. Good results are following from this work, and it is the privilege of all growers to assist, as all would reap the benefits. The experiments to control this disease are now pretty much confined to spraying the vine with various preparations in which the active principle is sulphate of copper, and the results accomplished indicate that they are in the right direction. These applications must be made before the mildew appears so that the spores will be destroyed as they fall upon the leaf, in advance of their taking root. The different formulas for making the preparations called Eau Celeste, Bordeaux Mixture, Sulphate Mixture, etc., are long, and as they are all contained in the report referred to, time will not be taken up with them here.

Minnesota is peculiarly well adapted in climate and soil to the growth of some early varieties of the grape vine, and a little setback from disease should not discourage the grower. Industry, good judgment and perseverance will make him master of the situation.

DISCUSSION.

Mr. Pearse. I burn all leaves that are diseased, and all the trimmings.

President Elliot. We are aware that these grape diseases are here and the question is now how to get rid of them. I don't know that we can find any remedy but perhaps we may.

Mr. Pearse. I have two questions to ask on the grape. At what time should grape vines be uncovered in the spring?

Mr. Dartt. When it is warm enough.

Mr. Latham. When you can go out and pull them up—that is the best time.

Mr. Harris. I think as soon as the frost is out of the ground and you can get them up.

Mr. Underwood. A good deal depends upon the location; whether they are grown in a warm and sheltered place. If they start too early in the spring the blossoms will be pretty certain to be killed by late frosts. We should not raise any grapes if

we took them up as early as we could; they would start too soon.

Mr. Pearse. My second question is, What is the best way to keep grapes, the fruit?

Prof. Ragan. Don't eat them too soon.

Mr. Allyn. Preserve them.

Mr. Pearse. No, I want them fresh. I want to hear from Mr. Latham, Mr. Gould, or others.

Mr. Frisselle. I can give you my experience. I have been enabled to keep grapes by packing them in baskets as you would put them on the market, keeping them in a cool, dry place, and covered tight. Put on a glass cover and keep them covered until you wish to use them. I have just finished eating Iona and Delaware that were kept in baskets.

Prof. Green. I have generally kept grapes for five or six years past until about Christmas. Our plan is to use trays about fifteen inches long and five or six inches wide. Set the trays one on top of another. We cut off the bad berries and lay them in single layers in the trays, then place them in the cellar in a cool place, a little damp, and we keep them there until Christmas. Sometimes we may have a warm spell, and then we put a couple hundred pounds of ice into the cellar.

Mr. Pearse. What varieties keep best?

Prof. Green. Nothing keeps as well as Catawba.

Mr. Frisselle. The Iona keeps well.

Prof. Green. It is a fine keeper, but hard to ripen.

Mr. Gray from the special committee appointed to confer with the city board of health, presented the following report:

We called on the city health officers agreeably to appointment, and listened to suggestions made in reference to the subject of the disposition of future accumulations of stable manure in the city. During the winter months the market gardeners about the city have taken care of the bulk of it, but during the summer months there is a daily accumulation of from four hundred to 1,000 two-horse loads to be disposed of, the practice heretofore having been to dump a large portion thereof in the river. For obvious reasons this practice can not be continued. The health officer informs your committee that he has conferred with the railroad companies in reference to shipping this manure out of the city, and finds them liberal in their ideas, and willing to assist in the solution of this question. The city pro-

poses to load the manure on the cars free of charge, so the cost to the shipper would be the cost of transportation only, and this would be affected largely by the amount to be transported to any given point.

Your committee suggested the fact that the members of our Society are scattered more or less over the whole state, consequently but a limited number could be directly interested in the subject.

We realize the dificulties in the way of an organized plan to have this manure utilized on the outlying farms. All must agree that it is a great, and almost a criminal waste, to have so much valuable material destroyed.

Therefore your committee would recommend that a permanent committee be appointed to canvas among the interested neighborhoods to the end that some arrangement may be made while there is an opportunity.

J. S. GRAY,
F. G. GOULD,
WILLIAM LYONS,
Committee.

President Elliot. We are having dumped into the river from three hundred to 1,000 loads of material every day that should go back to the farms, and it is a great waste. Our gardens will sooner or later show the necessity of saving this material, and there ought to be some way devised whereby it might be utilized.

Mr. Brand. Can't your local society look after it?

President Elliot. It is a nonentity; it has a name, but doesn't have an existence; it hasn't had any vitality for some time, or has run down to a very low ebb.

Mr. Gray. This matter was discussed by the local society last winter, but the railroads wanted so much for carrying off the manure a few miles that it would not pay. When it comes to paying a dollar a mile to the railroads to take a load to the farmers, they couldn't stand it. The farmers need it, but it is simply a matter of transportation at the present time. Some of the city officers are conferring with the railroad companies and I hope will be able to make some arrangements that will prove satisfactory. Of course the railroads would be benefited in two ways, every load that is carried out contains so much plant food, and will be returned again in the form of produce; it will be a source of wealth to the men who use it, an income to the rail-

roads and a relief to this city, and to those who live contiguous to the river into which this enormous quantity of plant food is now being thrown.

Mr. Pearse. This is a question in which I have been deeply interested and I labored on it for about two months. I found the gardeners were so indifferent that I finally dropped the whole matter in disgust. This manure is worth millions of dollars to them and it is being wasted by the thousands of loads. But as soon as arrangements can be made, we are going to get it.

President Elliot. If you are not too slow in making your arrangements, and do not let some syndicate step in and take this thing. If they do, the farmers and gardeners will have to pay for all they get.

Prof. Green. In Boston where I was foreman of a nursery, we used to buy large quantities of such material for use, and a high price was paid for it, and it was considered a good investment.

The meeting then adjourned until seven o'clock P. M.

EVENING SESSION.

THURSDAY, JAN. 17, 1889.

The meeting was called to order at seven o'clock P. M., by President Elliot.

The following paper was read by Prof. Green:

NECESSITY OF HORTICULTURAL EDUCATION.

By Prof. Samuel B. Green, St. Anthony Park.

Members of the Minnesota Horticultural Society,

LADIES AND GENTLEMEN: Allow me to call your attention to something of the progress made in horticulture, and also to the education best suited for the young men who desire to engage in it.

I well know that many of the efforts made to educate young men in this country, who would take firm hold upon agriculture and horticulture, and follow it as a life work, have been partially unsuccessful, and some times it has happened that for a

time the efforts to help have resulted in a temporary hindrance, and a set-back to the very object which it was intended to help. When these young men have failed, men have said: "You see how it is! As soon as a man gets an education, his inclination to labor with his hands, to raise the fruits of the earth, is gone. He will no longer stay in the country with its simple pleasures and rounds of duties; his place is in a store, or he should be a minister, doctor or lawyer; there is no need of book learning to cultivate a market garden, to run a green house successfully, or to raise grapes, raspberries or blackberries. All the education he needs is that of the common school and a short period of laboring in the garden, greenhouse or vineyard, and he can raise as good vegetables, flowers, grapes and berries as anyone. It is all nonsense to talk about education for farmers and gardeners; they do not need it, and all the money spent in trying to educate men to fill such positions, is as good as wasted. Such positions are servile and not worthy the entire attention of liberally educated men."

Much of such a tenor as this has been written and said, and that, too, by men who have honestly believed it. And they believed it because they thought that only was worthy the name of education which was classical in its nature. Such an education as is to-day given by the best agricultural and horticultural schools, in this county and abroad, was not known.

I well remember a man speaking to such effect at a meeting of the state board of agriculture in Massachusetts, about ten years ago, and Prof. Stockbridge's reply to him. The old man arose with dignity and said something like the following: "The gentleman who has just spoken is ignorant of the first principles of agriculture. He is behind the times in which he lives and is still enveloped in the fogs and mists that characterized the dark ages. Such language might suit the period of knight errantry, when men thought the only calling worthy of ambition was that of arms, but it is entirely unsuited to the time in which we live."

But these efforts to educate and make horticulturists have not been barren of results. The strong minds that believed a liberal education was necessary for a full development and were pioneers in the labor of introducing such education, did not labor in vain.

In the older states, from the agitation of this educational idea, has come much good. It served to stimulate horticultural and agricultural thought, and while the results at once achieved did not equal the expectations of the founders, much dissemination

of useful information resulted, and men have begun to think more seriously of the subject of thus applying education. Although farmers have talked a good deal about "kid glove," "side walk" and "educated farmers" with a sneer, they yet taught something about their business which was new and of interest to them.

Marshall P. Wilder was a man whom horticulturists delighted to honor, and one whose name is widely known in connection with his endeavor to establish agricultural and horticultural education on a helpful, enduring basis. I heard his reply to an attack on the Massachusetts Agricultural College. I think it was in 1880. Mr. Moore, whose name has been made famous in connection with the introduction of desirable fruits and vegetables, said the college had not accomplished anything. Mr. Wilder's reply was: "The farmers of Massachusetts have been the worst enemies of the college. While the college desired to help them, they would not help the college, but have criticized its administration scathingly, while they would not take hold and make the institution what it should be." In speaking of the education it had developed and the stimulation of agricultural thought it had produced in the face of these difficulties, he said: "A few years ago the names nitrogen and phosphoric acid were never heard in a farmer's conversation, and if most of them had been told that phosphoric acid was the son of Queen Victoria, and that nitrogen was his sister, they would not have thought it at all strange. To-day, the names of nitrogen and phosphoric acid are common words in farmer's meetings, and they understand their meaning and use them intelligently."

In Massachusetts the farmers have changed from a position of enmity to the college and its work and are now the best supporters of it and of agricultural education.

How has this change been brought about? When the country was new and the soil rich in the elements of vegetation, and noxious insects as yet did but little damage, there were not many grave problems which presented themselves to our farmers. They could grow wheat, grass, cattle and fruit without much labor. Then, too, the standard of living was not as high as to-day, and many things considered luxuries then, are felt to be necessities now. Then it was, that cruder methods of horticulture and agriculture prevailed and were successful. It was only necessary to seed down land, plant corn or apple trees, and good crops were produced.

No thought was given to the exhaustion of the soil, and it was treated as a spendthrift spends his money. It was continually drawn upon and no thought taken for the future. The pastures and arable lands of New England were continually furnishing potash, nitrogen and phosphoric acid, which were carried to the cities in the form of beef, pork, hay, milk, fruit, etc., and then thrown into the sea. Fruit trees grew and produced abundantly. There were few noxious insects. They did not have pear and apple blight, peach yellows or grape rot. They planted pear, apple and peach trees, and they grew without any special care.

This exhaustion of soils and the development of insects and diseases, produced a state of things which made it most necessary to educate our farmers, as they could scarcely make a living on the farms which had been worn out by this continually exhaustive treatment, and they were obliged to adopt some more rational farm system.

Another point which disturbed the calculations of horticulturists was the introduction of swift and cheap freight lines to Florida and the whole eastern coast. These routes brought in early vegetables before our gardeners could think of producing them, or planting them, perhaps. They brought in strawberries before ours were in blossom. This influx of early vegetables and fruits seriously injured our home markets; for, after the consumers had a taste of these fruits and vegetables, they did not feel so ready to pay the high prices which they formerly paid for those home-grown, and instead of our fruits and vegetables being first in the market, they were second. Then, too, there were the changes brought about by the development of noxious insects and weeds, and the need of more and higher grade fertilizers. All these difficulties and others made it necessary for our horticulturists and farmers to till the land closer and by more economical methods; to look more sharply after the insects; to more carefully husband their fertilizers, and to originate new and improved varieties of fruits and vegetables. Then it was that superior intelligence began to count, and horticulturists felt the need of a more liberal knowledge of the natural sciences to aid them in their lines of competition.

The education disseminated by the college has come into demand. The graduates and former students of the college have become active spirits in farmers' meetings. They write for the papers; represent their districts in the legislature, and to-

day the real strength of agricultural education in Massachusetts lies in its fulfilling a need, and in having gained a strong constituency among the farmers, by supplying them with what they most needed in the form of young, active, educated men upon the farms of the state, who dignify labor.

The history of agriculture and horticulture in Minnesota, will vary, in some important respects, from that of the eastern and older states. Minnesota is being developed in the face of competition from the older and also the newer states. It is necessary to raise here not only large crops, but crops of the best quality, to enable the producer to successfully meet competition and to secure a fair compensation for his labors. The people of Minnesota are progressive and active and will not be satisfied with anything but the best in each class. The farmer wants the best live stock, tools and help. The horticulturist wants the best varieties of fruits, vegetables and flowers. They are not satisfied with any second-rate goods. And so in turn the miller wants the best wheat; the public wants the best fruits, vegetables and flowers, and they will have them. Not only do they want them in their season, but out of season, and the very best. If they can not obtain them in the state, they send for them east, south or west. As the wealth, refinement and intelligence of the people increase, so must the demand for these products increase, and the willingness of the people to pay a fair price for the best. There will always be a call for second or third class goods, but as the grade of the first improves, so must the second and third, in turn. But second or third rate products often require nearly the same amount of labor as first, and the only difference in production may be the application of intelligence, while the difference in remuneration is that the first generally gives fifty per cent more profit than the second, or else it yields a profit while the second is sold at a loss. I might cite many instances where brains paid better than brawn in horticultural pursuits; but you are doubtless familiar with many such instances.

To-day there is great competition in every branch of business. Once horticulture was considered the essence of refined farming. It has now become subdivided into many branches. The whole field of horticulture was found to be too large for any one man to excel in as a whole, and we now have such subdivisions and hear such terms as the small fruit grower, the grape grower, lettuce grower, rose grower, the grower of aster seed, grower of

bedding stuff, forcer of tea roses, of hybrid perpetual roses, vegetable gardening, grower of vegetable seed, the florist, pansy-farm, strawberry farm, apple farm, and I might mention many other subdivisions, each of which calls for special skill.

No one man of good judgment would think of undertaking to cover the whole field of horticulture in his work. It is too broad. It requires too extended an acquaintance and too much practical application for him to do so successfully. Then again each locality has its special adaptation to special crops. In the counties of Ulster and Orange in New York, we find growing the Hudson River Red Antwerp raspberry, which is without doubt the best red raspberry in cultivation, but it succeeds in no other locality in the United States, that I can learn. We find that cauliflower and cabbage seed can be grown most successfully near salt water; that the Cuthbert raspberry is highly spoken of in some quarters, while in others it is as strongly condemned. Some apparently barren land in New England has been found especially well adapted to raising pansy seed; some sections of the country are noted for producing mints containing a sufficient amount of essential oil to make its manufacture a profitable industry. Only this week, I have received a package of cauliflower seed which was raised in Washington Territory and I think it is a precursor of a new industry there. In each state and locality, we find that only a limited number and kind of fruits and vegetables are recommended; and undoubtedly these lists could often be much more circumscribed with improvement.

New crops and methods of raising crops are continually being brought to light. A comparatively few years ago all the cranberries in the country were produced without cultivation on natural bogs, and there was no literature on the subject. To day there are thousands of acres of cranberries cultivated on artificially prepared bogs and the yields are sure and ten-fold greater. Cranberry raising has become an important business and there is a great amount of reliable information on the subject.

The same thing can be said of the strawberry and the raspberry. They have been developed and become generally cultivated within a short time.

I would mention many improvements made in flowering plants, vegetables and fruits; how we now have many improved varieties of flowering plants which afford pleasure to thousands, and a substantial means of livelihood to hundreds of our citizens.

Great improvements have been made in roses, especially in the development of hybrid, tea and perpetual classes.

Great improvements have been made in pansies, chrysanthemums, carnations, asters, etc.

In vegetables a great advance has been made in twenty years, in improved varieties of onions, celery, beets, cauliflower, cabbage, etc., while our fruit lists have been wonderfully improved in the same period.

In all departments of horticulture there have been great improvements made; so that the gardener of fifty years ago could not make a living and use the same methods and varieties that he did then. We have given up large kinds of celery and planting it in trenches; we no longer consider it necessary to trench land to grow onions; we cultivate our strawberries with a horse instead of by hand. Our florists conduct their business on business principles, and grow their crops in a wholesale way. Flowers and dealers in flowers are common. I think it would surprise a florist of twenty years ago to hear of a rose grower who had a selling agent in each of three cities, Boston, New York and Philadelphia, whose sole business it was to sell roses at wholesale, or to hear of flowers being shipped from Boston to Chicago, to be there distributed.

These instances which I have stated, may serve to give those not acquainted with the work, some little idea of the advance made in horticultural pursuits within the memory of the middle aged man. And does anyone doubt that the advances and changes of the future will not be as great as those of the past? When scarcely a day goes by without some new discovery, and when we have many experiment stations, whose sole duty is to investigate agricultural and horticultural matters in the light of science. Who knows in how many ways we may call electricity to our aid in raising plants, and in utilizing the nitrogen of the air as a fertilizer! While the introduction of new varieties of fruits, vegetables and forest trees is tremendous with its possibilities.

Can any man of good judgment, in the light of these facts, combat the idea of a horticultural education? I think not. The only question on which horticulturists differ, is the kind of education one should receive, in order to best fit him for his avocation.

Now, of what should this education consist? I would have our future horticulturist brought up in the wholesome atmosphere of a christian home, and taught that success in life was

co-ordinate with his success as a christian citizen of this great republic; that success in life was not synonymous with the making of a large amount of money by hook or by crook, so long as he did not bring himself under the law. I would have him imbued with a love of nature, and a respect for manual labor, and acquire the habit of depending on his own judgment, and of asking questions and keeping his eyes open. I would have him believe it were better to be thought a fool than to be one.

Wherever our future horticulturist may be, he should have a small garden, hot-beds and hens of his own. He should have a fair stock of garden and bench tools and be allowed to use them, even if he did leave the chisels and saw very dull. He should have all the produce he raised, should be encouraged to experiment with various kinds of seeds and fruits and to note how, and when they grew. He should only cultivate so much land as he can cultivate easily and well. Try to furnish him interesting reading on such subjects as fruits, flowers, vegetables and poultry. Give him a chance, and encourage him to play and take some recreation, and in a general way supply him with so much of interest to think about that he can not find time to let his mind run on foolish thoughts. Teach him "of a little to save a little," and that "a penny saved is a penny gained." He should respect the calling of a minister, but should know how grand a thing it is to be a noble layman. Take him to the city, perhaps send him to market with his own produce to teach him to trade and let him see how the produce of the land reaches the consumer. Let him understand that the middle man has a good and legitimate work to do. Have him see the great factories and let him understand that they are producers of wealth and necessary for the well being of society. At the same time I would tell him for how small a salary many clerks worked and that in the slow-going city of Boston ninety-three per cent, and in New York ninety-seven per cent of the men who go into business fail. He should understand how much power for good was in the hands of a strong, determined, clear-headed lawyer, and how much there was for wrong. At the same time show him that young lawyers have a pretty hard time, generally, and that it requires years of hard application to become an expert in law, and that many good lawyers after leading a worried and fretted life are left in needy circumstances in their old age. He should understand the blessings which a physician may be able to bestow, and the power he may be in helping nature make our bodies do better service.

He should also know how long it takes to gain a practice and a living, and that it is not the easiest nor pleasantest thing in the world to be continually coming in contact with sick people. To-day, we have more doctors than are needed for health; more lawyers than are needed for justice; more ministers than are needed for religion, and more middlemen than the farmers can support. Thus the boy is receiving impressions easily and carrying on this education himself, without realizing it. When the time comes that the boy has reached the limit of the district school the father wishes he could have a more liberal education, but his observations have made him afraid that if the boy studies too much in the current schools of to-day, he will be desirous of being a bookkeeper or clerk and get out of sympathy with manual labor; and the father hesitates about educating him further. Now is the time when the boy should be put in some horticultural school to strengthen his powers of observation, to broaden his ideas of horticulture, and to increase his knowledge of the natural sciences which underlie all agricultural and horticultural operations.

What these studies should be, I will not enumerate, but will say that the curriculum, as laid out for the agricultural school of the University of Minnesota, carried out fully and with special prominence given to the natural sciences, but with the requirement of an additional year of study, would meet the necessities of our present needs as well as that of any course I know. The young man would know more about horticulture and agriculture than anything else, and there would be no trouble about his following them as an occupation, and when the time came for him to decide on a profession for life with a seriousness that should be given to such a choice, he will choose this branch because he is most familiar with its great possibilities, and he has become acquainted with the idea that "it is the man who makes the occupation," and not "the occupation that makes the man," and that horticulture yields as good interest for the money invested, as any safe business, and that it does not make so much difference what business a man goes into as how he applies himself to it. After such a training the young graduate would naturally turn his attention to the cultivation of the soil, and I know if such young men will follow the practical part after they graduate and obtain reasonable experience in practical lines of horticulture, they will not lack for positions which are interesting and also remunerative.

There is to-day a large call for active young men of good education and experience in horticultural pursuits. This training may be gained with very little expense, and I think a young man with it is more independent and as sure of a living and a competence, as he would be by any other system.

I wish to call your attention to a few facts taken mostly from a paper by President Goodell, of the Massachusetts Agricultural College bearing on this point, and showing somewhat the extent of agricultural education abroad:

In all, the German empire contains not less than one hundred and eighty-four agricultural colleges and experiment stations.

The agricultural school at Berlin forms simply a department of the university, having its own separate faculty, lecture rooms, apparatus, etc. Its staff consists of ten professors, twenty instructors, and six assistants, besides clerks, modelers and others.

The French government recommends that in the selection of teachers, preference be given to those able to impart instruction in agricultural subjects; and in some departments this is made a requisit of first importance. France contains not less than eighty-nine agricultural schools, and twenty-five schools of horticulture.

The Abbott institution at Glasnevin furnishes the higher agricultural education of Ireland; and to it are brought yearly at the expense of the government, the schoolmasters of the lower schools, fifty at a time, for a six weeks' course.

In closing, it seems to me that the lessons we have to learn from foreign governments and from our own experience are: That the state must take the lead in introducing and maintaining agricultural education; and that agricultural science should be introduced into all our public schools, from the lower grades up; and be made compulsory, even if in order to find time for it, we have to dispense with some of the less important studies now taught.

In a state like Minnesota, whose main resources are agricultural, there can not be too great a dissemination of agricultural education.

In this age of close competition and speculation, we should remember that the day when quacks and empirics were successful has gone by and that now, intelligence, care and foresight, when associated with industry, are the winning qualities. To-day the man with the best training wins, and it is but the carrying out in every day life of the idea, that other things being equal,

a good theory is the first step in a successful practice. The successful horticulturist of the future will be the man who "progresses with science and practices with prudence."

The following paper was read by Mrs. Campbell:

ETHICS OF HORTICULTURE.

By Mrs. V. H. Campbell, Evansville, Wis.

"As a man thinketh so is he," may well be supplemented by the expression, as a man worketh so is he. It is an incontrovertible fact that the nature of a man's business vitally affects his character on both its moral and intellectual sides, and it does not require close scrutiny or a deep insight of character to determine a man's occupation by his personal appearance. Labor in one channel for successive years has the effect to change not only muscle but bone, so that in time the very features have assumed a difference of expression. We can readily discern a man who tills the soil, and so it is in the various professions, each man's face bearing witness of his occupation.

When man, through the exertion necessary to applied effort, has become self-sustaining, he has climbed the first round of the ladder of individual existence — has become an important factor in the industries of the world.

The primal man — possessing only the most limited mental outreach, feeling but the promptings of physical needs, — was stimulated to only a sufficient amount of exertion necessary to provide for those demands, viz., food and shelter. As his ideas of each were very crude, his efforts to obtain them were sluggish and limited and were only stimulated by immediate demand, consequently he manifested little or no desire to provide for future emergencies. But after a period of slow evolution, the inner man was developed to a degree that the needs of the individual were largely multiplied. Especially would this be the case if he dwelt in a climate sufficiently rigorous to give him brain stimulus; if it was too rigorous he would remain enervated and sluggish as in the other extreme. As his wants became multiplied new appliances for obtaining those necessities became necessary, and his hands, directed by his crude ideas,

began clumsily to fashion them, and he had climbed another round of the ladder — he was a contributor to the wealth of the world.

Man has made great advancement in the scale of human progress when his æsthetical nature has developed to a degree that prompts him to surround himself with the beautiful and to cultivate fruits and flowers. He has then advanced sufficiently to dignify the labor that has developed and glorified him; that has made him the fittest to survive. For,

> "Labor in life. 'Tis the still water faileth,
> Idleness ever dispaireth — bewaileth."

Although labor tends to energize and individualize, yet man makes no intellectual advancement by labor mechanically performed. He who merely plods along will never meet with marked success, for to succeed in any profession one must have a real love, a stirring enthusiasm, for his work; an enthusiasm born of love of the work, an enthusiasm which lifts it above drudgery. Especially is this essential to perfect success in the profession of horticulture. An intelligent person revolts at the idea of being nothing more than a machine. His thoughts keep pace with his hands and he does not turn out inferior or second rate work.

The ethical culture of the horticulturist should be of the broadest kind. Honesty of purpose and integrity in dealing with his fellow man should be strongly defined in his code of ethics. Benevolence, conscientiousness, punctuality and order should be the cardinal points in his character, and tributary to these, all other qualities that tend toward the advancement and elevation of the individual.

There is a peculiar beauty to be found in horticultural pursuits — an ineffable charm and delicacy in watching the growth of and caring for fruits and flowers — that constantly tends toward the development of a higher moral and intellectual life, for no one will deny that there is a moral development in beauty itself for the individual who possesses a sense of appreciation, and he will be uplifted by it; its influence on him will only be limited by his ability, whether natural or cultivated, to appreciate the beautiful in the world. The indifferent eye sees no beauty in his lines of life, whilet he æsthetic eye sees beauty in every wayside shrub and flower. While each expanding bud preaches a sermon of love to the one, the other passes it by unheeded. The differ-

ence is in the individual; the object is the same. Wordsworth says:

> "Who has no inward beauty, none perceives,
> Though all around is beautiful."

And Coleridge says:

> "We receive but what we give,
> And in our lives alone does Nature live."

There is a charm, refreshing and exhilarating, in the study of nature, not to be found elsewhere. Nature's museum lies at the very threshold of our own doorway if we but open our eyes to the fact, and seek the wonders, to the careful observer revealed; and we possess no one faculty capable of so great cultivation as the faculty of observation. This power of observation is the power of intensifying thought upon objects seen, so as to produce lasting impressions. To be able to see a fact and make an intelligent note of it is a faculty all possess, in a degree only limited by the amount of cultivation we have given it. A distinguished writer has said: "The eyes are of no use without the observing power." And how negligent we are about cultivating that power. Of how many of us can it be said: "Having eyes, they see not." The faculty of observation has much to do with the success of horticulturists; they must possess the power to investigate, read, and interpret nature in an eminent degree; they must be able to go to the fountain head and draw knowledge from the original source. He who can observe nature understandingly is like the mariner, who, with chart and compass, cares not for the shining of the sun nor the glimmering of the north star, but steers confidently on o'er the trackless deep without a fear, for he has an unfailing index before him. The cultivation of the power to observe should be commenced very early in life, for with it many a difficult lesson is easily mastered.

The profession and study of horticulture would seem to the casual observer to be one unending round of delightful and pleasant duties. The horticulturist lives close to Nature's great heart, and to him she confides her utmost secrets; to him she discloses the wonderful problem of assimilation and growth. Through the propagation of her fruits and flowers she reveals to him the laws which govern the material world. She is his handmaiden, and by her aid he watches the scale of gradation from the lowest form of organism to man. Her book is open to him, and on its pages he reads laws that are identical in lower and

higher forms of life. He knows that what some are pleased to call sports, in the vegetable world, are simply the results of higher cause little understood; that Nature never makes mistakes, takes freaks, nor produces "sports,"—yet with all the fascinations of the study and work connected with the profession of horticulture, the high road to success is far from being a smooth one. The horticulturist is constantly called upon to deal with new factors; new avenues of exchange are being opened; greater requirements must be met.

Propagation and cross-fertilization constantly produce new varieties which must be carefully tested, and the good culled out from the worthless. Climatic changes have to be met which require new methods of adaptation. The present era of sharp competition—an era which has come to stay—is doing much to change the relation of the horticulturist to his profession, and to be able to acquire any degree of pecuniary success he must be fully alive to the exigencies of the case; he must be constantly on the *qui vive* to seek out and adopt every agency for the enlargement of his knowledge of the facts surrounding him and the wider relations to which his interests are constantly tending; in short, he must put forth greater efforts to provide for better methods. He must have lists of facts, every one of which may be separately verified, valued and revalued, and the whole accurately summed up. A clear recognition of the possibilities and limitations of the profession is of vast importance to those who would woo success; to be able to acquire any possible degree of success, there is necessity for mental activity—a hundred times more so than was the case a half century ago.

He can no longer follow in the furrow which his predecessors have turned, but must strike out new lands for himself. Horticulturists will have accomplished much toward driving out the unequal and damaging competition of the oily tongued tree peddler with his wonderful and unnatural productions, if they will confine themselves a little more closely to the text of the golden rule and cultivate conscientiousness more. A perfect confidence once established between them and their patrons will not allow the intervention of those dishonest scavengers who reap the fruit of honest men's toil.

The man who conducts the long line of experiments necessary to produce a new variety that shall prove satisfactory for general cultivation is a public benefactor and should be regarded as such, but alas! the truth is, the public is usually very slow to

make any such acknowledgement. We seldom think, when eating our luscious fruits or admiring our beautiful flowers, of the careful, painstaking labor — the anxious watchfulness — that has brought them to their present degree of perfection. We are indifferent to and thoughtless of the labors of these men, yet the names of Harris, Gideon, Ragan, Budd, Peffer and Loudon, together with a score of others, who have spent years of their lives in developing, demonstrating and adapting certain principles of nature, will go down to posterity while ours will have been long forgotten. When we look at simple results we are often disappointed with their meagerness compared with the expenditure of time, labor and money they have cost, but it is unfair to measure them in that way. It is not the labor, the time nor the hundreds of dollars an experiment has cost that should be counted if a theory, a fact, has been demonstrated that shall prove a foundation upon which to base further investigations. The need is for more insight as well as for more outlook. There is also a need of an awakening in the interest of horticulture — an arrest of thought in the profession. People not directly interested in the cultivation of fruit are slow to perceive that the study of horticulture holds any attractions for them. Education furnishes a remedy for this indifference. Early impressions are lasting and enough of horticulture should be taught in our common schools to familiarize children with the trees and shrubs indigenous to our country, also our fruits and the methods of their cultivation. As horticulturists we have a duty in this direction that we can not afford to neglect.

In the course of evolution, new generations outgrow the conditions of preceding ones; new words are coined and the old words receive new definitions. The word horticulture, in the last quarter of a century, has grown to signify more than it did formerly and, in its larger signification, covers a wide range.

It has outgrown its former restricted definition and is now regarded as a science which includes not only the modern sciences and arts which relate to the orchard, the garden, the vineyard, and the forest, which is essential in our rigorous climate for the protection of them all, but also relates to all that embellishes the home, the park, the public highway and the farm, as well as to other branches of industry that directly affect all of these interests. With the broader meaning of the term there is no need for the modern horticulturist to grow narrow. His education must be of the broadest kind; let him leave the narrowness —

the "one idea"—to those in some of the, so-called, learned professions who are only educated in one particular line of thought. I have been pained to note a disposition among some of our leading horticulturists, at the conventions I have attended, to crowd out every topic not strictly relative to the cultivation of fruit and flowers. I have noticed the shrug and frown of impatience and the inclination to check discussion when papers were presented on subjects that related to the home and its outlook for a better regime in the future. I have been sorry to see this tendency, because I feel that all these things are essential to the broader development, and the horticulturist should guard against everything that will tend to make him warped and one-sided in his nature; he must uproot all these tendencies to narrowness and not tolerate them any more than he would the distorted and unsymmetrical tree.

The evolution in ethical culture which the horticulturist is sure to experience, very largely, affords an imposing outlook for his future. Virtue and happiness are inseparable in the goal which he approaches in a steady line of advancement. Nature herself leads him on and he instinctively feels the assurance, within himself, of victory. Ceaselessly bent upon the advancement of his profession, restlessly at work improving the conditions of his existence, he simultaneously strengthens his moral life, while at the same time the influence of his own right life will serve as an inspiration to others. A beautiful faith is the faith in the upward tendency of humanity; it renders easy the numerous battles, the countless sacrifices and the dangers that betide the way.

Although we meet, at these conventions, give cordial greetings, read papers, discuss different methods, and part again with regretful good-byes, we are, unconsciously, perhaps, marking epochs in the work, making history, and making horticultural literature that may serve as stepping stones for those upon whom our mantles may fall. It is to be hoped that we may leave some lighthouse, built upon our rock of experience, that may warn others of reefs of danger whereon we have been well nigh stranded. And although the obstacles that we may meet may often seem too great to be overcome and our progress so slow that we can scarcely note any advancement, let us not forget that

"The sweetest parables of truth,
In our daily pathway lie,
And we read, without interpreter,
The writing on the sky.

"The sunshine drops, like a leaf of gold,
From the book of life above;
And the lily's missal is written full,
Of the words of a Father's love.

"So, when we turn from the sacred page,
Where the holy record lies,
And its gracious plans and promises,
Are hidden from our eyes,

"One open volume still is ours,
To read and understand;
And its living characters are writ,
By our Father's loving hand."

Mr. Wilcox moved a vote of thanks to Mrs. Campbell for her able and instructive paper, which motion was adopted.

On motion of Mr. Gray Mrs. Campbell was made an honorary member of the Society for five years.

To which Mrs. Campbell replied:

Mr. President and Members of the State Horticultural Society:

I thank you most sincerely for this honor, for I certainly deem it a great honor to be a member of your Society. I will say I have been very much pleased with your convention and the way I have been received and so pleasantly entertained; I hope the time will not be far distant when I may be able to meet with you again.

The following paper was then read by Mrs. Underwood:

ROSES.

By Mrs. Anna B. Underwood, Lake City.

A great deal might be said upon "the ethics" of rose culture; many quotations from rose-enraptured poets and prose writers might be made; enough in fact could be selected to fill a good sized volume, and even then the subject would be far from exhausted. But such a course would be unprofitable at this time, for although our members might listen in a courteous manner to such an article read to them, in a printed volume I fear the said article would be studiously avoided, because these volumes of the Horticultural Society are only read by busy people to whom

time is money, and who do not have to read to kill time. So, instead of writing upon the beauties of and the pleasures obtainable from roses, it will be wiser to attempt to make these beauties and pleasures attainable by flower lovers.

Among my friends I can not name over a half dozen that have so much as one rose bush in their yard. And this condition of affairs is no worse in our town than it is in all others of the state. And how is it with the farmer, with plenty of ground, with all the necessary implements for work, fertilizers in abundance, plenty of sunshine, etc.? Does he revel in roses? Does he occasionally bring in to his good wife a nice boquet of fresh-opened, brilliant Jacqueminot roses, or a large handful of the dainty buds and blossoms of the lovely white Mad. Plantier, with the fresh drops of dew upon them? By contact with them feeling the presence of God, and by the act of giving them, brought into closer harmony with his home? Such a gift convinces any one that the love and affection of the donor goes with it.

The chief reason for this great dearth of the Royal Beauties is that it is generally believed that they can not be grown successfully in this climate. It has been fully demonstrated, however, that with a little care and right management, our eyes may be gladdened and our homes beautified with the presence of this queen of flowers. Let each one of us make it a point of duty to our Society, to urge his neighbors (of course each one here is supposed to have them in his yard), to plant roses and plant them in profusion.

A theory of mine is that detailed experiences, failures and successes alike, are more helpful than simple rules laid down for following; as any one can make rules but we do not all have experiences; and knowing wherein a failure has been made, we can strive to avoid it if forewarned.

And now a leaf from my book of experiences relating to rose culture: About four years ago I had an attack of "roses on the brain." I already had some eight or ten kinds in my garden, but there was not variety enough, either in color or name. So I consulted catalogue after catalogue, and the result was a most glorious list of between sixty to seventy varieties, and really some of the names were quite new and beautiful! The plants were sent for; they arrived in good condition and were put in the grounnd, and the names on the stakes, to say the least, were very imposing. If I could I would pronounce some of them, but my early education in the foreign languages was neglected. After

the plants were set out the ground looked so bare, that annuals were planted between them, fast growing kinds that soon covered the ground, and the bushes, too; to their detriment, however, as they soon ceased to grow, and fall found them but very little larger than in the spring, and consequently with but little vitality to endure the winter, which was a severe one. Spring found many of them injured, killed back to the ground; but after awhile new growth started from the roots in profusion, some of it being four, five, or even six feet long. What a wonderful wealth of flowers would be mine another year! I made a memorandum of these rapid, strong growers, and also recommended them to friends. The uninjured plants made fair growth and gave a reasonable amount of blossoms through the season. In the fall all were carefully covered again. The following spring they came out beautifully, particularly my rapid growers of the previous season, and were alive to the tip bud; but for some reason they would not blossom, although they branched out and grew finely. In imagination I could see how beautiful those tree like bushes, way above my head, would look covered with blossoms. Last spring, however, when the month of roses came — the secret leaked out — all the luxuriant growing kinds I have mentioned, put out a very few blossoms each, and they were exactly alike, a small single rose. I waited until fall, and then had them grubbed out. No more budding roses for me, unless they are top worked as tree roses. So, to begin with, be sure that your roses are grown on their own roots, and not grafted on wild stock, and then all the growth from the roots will be the pure article, ready to bloom if given a chance. If the roses are to be grown in beds plant all of one kind or color together. Do not mix the shades. Study harmony in color if you desire your roses to appear to best advantage. I have in mind now two splendid dark roses, Pierre Notting and Fisher Holmes, with just a shade of difference between them, growing side by side; the branches interlacing. An artist would say they kill each other but when arranged in separate vases or boquets each is a rich, beautiful rose.

In starting a rosery, unless the soil is A No. 1 in every respect, dig it out to the depth of a foot or more and fill in with the *best* you can get, *making* a soil if necessary, for roses, to do well, must have it rich and mellow. There is little, if any, danger of having it too rich.

Do not hesitate to trim the bushes closely. It is a great temptation I know to leave those long branches, but cutting them back to twelve or eighteen inches will cause many more branches to start out; and the blossoms are increased. Never allow them to go to seed, as it is always at the expense of the blossoms. It will be quite a little tax to watch them so closely, but they will repay the time spent on them many fold. In the rose bed hybrid perpetual and moss should be planted about three feet apart. The teas or smaller growing varieties may be nearer together. And here I will speak a word for the tree rose. No handsomer ornament can be found for the lawn or garden, however small, than the tree rose. Standing three feet or more high on its hardy stock, every individual bud and blossom can be seen, and budded with hybrid perpetual roses it is a beautiful object the season through. They seem to be exceptionally profuse bloomers, as many as two hundred and sixty blossoms having been counted on a single bush. They are as easily cared for as other roses, requiring in fact the same management. During the summer keep the ground well stirred, not allowing a weed to grow as the sunlight is fully as needful on the soil as on the foliage of the plants. If the season is dry, water once a week thoroughly at night and if possible shower them.

The only enemy appearing on the scene, thus far with me, has been a small, pale green worm, working on the underside of the leaves. They appear very suddenly, between two days as it were, and until last season they were very injurious to my bushes. Not being on the watch for them the dead or dying leaves were ascribed to dry weather and it was a source of much sorrow to look on the poor denuded branches. During this period my rose bed was anything but a thing of beauty. In a few weeks time however they were in full leaf and bloom again. This season I resolved to be on the watch for them, and every morning the underside of the leaves was closely scrutinized; just as I had begun to congratulate myself that I would not be troubled by them my watchfulness was one morning rewarded by finding on the first bush examined my dreaded enemy, very small in size, but alas! on almost every one of my one hundred plants. We had a quantity of London purple on hand and I determined to try its effect upon them, so with one part of London purple and three parts of flour and in a tin pepper box I sprinkled the undersides of the leaves in the early morning before the dew was off. I cannot say whether it killed them

or whether they objected to the kind of seasoning in their food and left. There were no remains lying around and I did not witness their departure. The fact sufficient is that in three days time there was not one left on the leaves and my roses did not drop their foliage as usual. On applying the powder, however, with a light breeze at the time, some would get on the buds, and I found that they were more or less injured, the smaller ones refusing to perfect themselves. I could not see that the leaves were affected in the least. If the worms appear next season I shall try London purple with a larger proportion of flour and take extra care not to get it on the buds. Would like to inquire if any one has used it with water or any other way and in what proportion, also the scientific name of the worm. With regard to varieties. If one variety has stood the test well with you, is a good bloomer, strong grower, good color, etc., "*tie to it*," have a dozen plants, a whole bed of them, for it is profusion of buds and blossoms in roses, not numbers of varieties that gives the greatest amount of satisfaction. For one starting out on a small scale, say twenty-four plants, I would suggest the following list as good: 4 Gen. Jacqueminot, 4 Fisher Holmes, 2 Alfred Colomb, 2 Climbing Jules Margottin, 2 Moss, 2 Mad. Plantier, 4 Coquette Des Alpes, 2 Tree roses in white and 2 in red colors. The main feature in successful rose culture, good soil and sunny location granted, is *proper protection* in winter, with which any variety may be grown; straw and leaves are not suitable as they do not prevent alternate freezing and thawing which saps the vitality of the bush and is fatal in its results. I have found that a sure and successful way is to lay the bushes down carefully so as not to break them and cover completely with dirt and sod. Be in no haste to uncover in the spring, as some of the tender varieties may be injured by late frosts; when you feel positive there will be no more freezing weather, then is the time to uncover. Finally, what can I say to induce more of our farmers and townsmen to plant and cultivate roses? Having pointed out the way, may I not hope that their beauty and fragrance will woo you to the effort necessary to possess them?

Mrs. Gould from the Committee on Floriculture presented the following report:

ROSE CULTURE.

By Mrs. M. S. Gould, Excelsior.

That choice roses can be successfully grown in Minnesota, is no longer questioned. June roses will endure more cold and neglect than any others, and are therefore still valuable, especially to people who can have no others. Some are fragrant and beautiful, but are not equal in attractiveness to the newer varieties, and the public generally are not satisfied with a rose that will bloom but once.

For open air culture in our climate Hybrid Perpetuals are the most valuable class; none surpass them in attractive qualities sought for in the rose, viz., size, form, color, fragrance and habit. While it can not be claimed that these give such constant bloom throughout the season as the Teas, Bon-bons, Bengals, etc., commonly called monthly, or ever-blooming roses, yet they may be depended on to produce a good quantity long after the last June rose has disappeared.

Monthly roses are too tender for outdoor culture, as they can not endure the amount of cover needed to protect them in winter. To be more explicit, they are liable to rot or mould, the wood not being sufficiently ripened at the time they must be covered.

The Hybrid Perpetuals need covering to ensure them through an average winter, and they will endure the ordeal, coming out well rested from the long sleep. Notwithstanding the severity of last winter (1887-8) we lost not more than two per cent.

After giving one hundred varieties (selected on account of their superior merits as claimed by numerous individual growers) a fair trial, we have decided on the following as among the best for our use, and for general cultivation:

Gen. Jacqueminot, brilliant crimson, fragrant and hardy.

Fisher Holmes, dark crimson, a superb rose.

Alfred Colomb, brilliant carmine crimson; one of the most useful for general cultivation.

Baroness Rothschild, light pink; without fragrance, but of beautiful form and a late bloomer.

Caroline de Sansal, pale flesh color, deepening toward the centre, a lovely rose.

Anne de Diesbach, carmine, a beautiful shade, fragrant; a superior garden sort.

Baron de Bonstetten, rich velvety maroon, large and full.

Marguerite de St. Amande, bright rose, vigorous, valuable.

Paul Neyron, deep rose color, a free bloomer, very large and desirable as a garden rose.

John Hopper, bright rose with carmine centre, large and full; a profuse bloomer.

Salet (perpetual moss), light rose, large, full, pretty in bud; one of the most valuable.

Mable Morrison, white, sometimes tinged with bluish; a fine rose but shy bloomer.

Madam Plantier (June rose), vigorous, white, fragrant; free bloomer, early in the season.

Queen of the Prairies, bright rosy red.

It has been suggested that I should add to this imperfect report, something of how to grow them. I fear I should be poor authority, household cares having occupied too much of my time and attention. I might give a few items, though, viz., that the selection and preparation of a suitable place for planting is very important. An expert rose grower once said, "All that follows depends upon the care used in this first step."

Good, rich soil deeply worked in a location protected from bleak, sweeping winds, northern slope preferred, sunny, but a situation partially shaded from the hot rays during a portion of the afternoon is desirable. In short they are worthy the best place in your garden.

On motion of Mr. Sias a vote of thanks was given Mrs. Underwood for her interesting paper.

DISCUSSION.

President Elliot. I think there are quite a number of points that are very instructive in this paper. I would like to inquire of Mrs. Underwood what protection she gives to roses?

Mrs. Underwood. I cover with earth around the bushes in the ground. Some times tender varieties need to be covered with boards.

Mr. Pearse. At what time do you uncover them?

Mrs. Underwood. After the snow is gone and when the leaves begin to start. I don't think it is well to let it go too long.

Mr. Carleton. When do you do the pruning; how soon after they are uncovered?

Mrs. Underwood. In the spring as soon as uncovered, before the leaves start out.

President Elliot. Why I inquired about protection was, I have been experimenting with roses some little time, and trying some hardy varieties the last two years. We have always had more or less trouble in our sandy soil, it being too warm some years, and in others they would come out in good condition. We have tried putting them down and covering with earth. The last two years we have covered entirely with leaves. We take a sheet and spread it out and gather the leaves in it. We pin the bushes down close to the ground with forked sticks and cover over with leaves, and throw some pieces of boards over, and that is all the protection given. My roses have done better in that way than by any other treatment.

Mr. Gray. What varieties have you?

President Elliot. Gen. Jacqueminot, Maiden Blush, Madam Plantier, Moses, and half a dozen other different varieties.

Mr. Smith. Do you put the boards on so as to keep the water from settling in?

President Elliot. Just enough old pieces to carry off the water.

Mr. Frisselle. What was the character of the subsoil of your ground?

Mrs. Underwood. I guess Mr. Underwood can tell better about that.

Mr. Underwood. Clay subsoil; black soil on top. I will say in regard to covering that we have not had as good results with straw and leaves as with dirt, or boards. I have kept them very well with boards alone, but think the proper object to be gained is to keep them from alternately freezing and thawing. Perhaps leaves will do it, but I think we have had better results from the use of earth than from leaves or boards. I am anxious to try a plan recommended by an enthusiastic grower of roses in Canada. He digs a pit, and takes up his roses every fall, and places them in the pit. He grows the most delicate varieties, and takes them out in the spring and resets them.

Mrs. Campbell. I would like to suggest that if Mrs. Underwood will use white hellebore, it will destroy the bugs without injury in any way to the bushes. I think the little worms she describes are the common slugs.

President Elliot. Do they roll the leaf?

Mrs. Underwood. No, sir, they do not. They look very much like worms that are found on gooseberries; it is a green bug with a big head.

Mr. Harris. I can corroborate what Mrs. Campbell says. White hellebore is a perfect remedy and where I have used it, I have saved every plant.

Mr. Pearse. If I wish to hold back my roses until in July, how shall I do it? I was told if I would cover with sawdust, I could hold them almost any length of time, and that I should not take up but a part of the roses at a time. I am going into the rose speculation as I live on a thoroughfare where there are thousands of people going to and from the lake and I wish to arrange our yard so that people passing by can look at something very beautiful.

Mr. Underwood. I don't think I should invest much money in sawdust. It is a first class thing to retain heat and to make things start, at least that is our experience in the nursery. If I were going to try anything I would cover well with dirt and mulch well with any course litter, that would keep frost in the ground as late as possible. That is the only way, so far as I can judge, you could accomplish anything.

Mr. Gould. Don't cover too early in the fall. As a rule, I do not cover until late, but I would uncover when satisfied the mercury would not go down again to zero. A great many leave them in the ground too long in the spring. It is almost fatal to leave roses long enough for the buds to start.

Mr. Pearse. I have another question to ask. I have covered in various ways; I have had very good success. The best success is in using barrels with no heads. A barrel would set over a rose bush. I have filled that with leaves. Now can you tell me what will be the result?

Mr. Underwood. They will probably die.

Mr. Bunnell. The tender ones won't stand it.

Mr. Pearse. Well, I have Gen. Jacqueminot.

Mr. Smith. If you succeed in that way write an account of it and publish in the *Farm, Stock and Home.*

Mr. Pearse. I am told if you let the covering of leaves get wet it will injure the rose, but not if you keep them perfectly dry. I have experimented on it and think it is a desirable way.

Mr. Harris. I was going to tell Mr. Pearse he would have to put something over the barrel, and it would be a good plan to bore one or two small holes so if moisture accumulates it would work out.

Mr. Smith. I think Mr. Gould made a good point about coving too early. I have sometimes covered too early in the season

as I have found when uncovered in the spring. Have found the same result where the ground froze and cracked open so the water would run in and they got wet during spring when the frost was coming out. I think we should wait just as late as possible before we cover them. Be careful to round up the earth to throw off the water, and then use some mulching of some kind so the ground won't crack; that is of advantage. That also keeps them back in the spring.

Mrs. Stager. I have had good success in covering by putting a lot of straw over them and making quite a mound of earth. Last spring, not having much help, it was near the middle of June when they were uncovered; the consequence was I grew the most beautiful roses I ever had. There was a fuller bloom than I have ever seen before. People would come from six and eight miles around to see my roses.

President Elliot. I would inquire if the rose buds had started much?

Mrs. Stager. Not at all. They had just commenced. They looked a very light green color and I was afraid it would kill them entirely.

Mr. Pearse. I am in favor of covering with earth. I have tried it. It should be done I think as late as possible when the wood is as ripe as it can be. My neighbor, a lady across the way, has had wonderful success. I never have known her to have her roses injured. She covers late with coarse litter from the barn and then protects the covering from moisture. Her roses have never failed to come out and I am impressed with the idea it is the correct way.

Mr. Reeves. I would ask if any of those who have covered with leaves or straw have had trouble caused by moisture. I never raised but a few roses, but I covered twice with leaves and straw and both times the mice girdled the plants. I have covered with dirt and had good success.

President Elliot. There is no trouble covering with straw or mulching, providing you take a little tin can and put in a little corn meal and mix in a little strychnine and lay it down among your rose bushes. The mice will always find it and will never leave it.

Mr. Bunnell. Where you cover with stable litter is it not liable to be too hot?

President Elliot. I never cover with that.

Mr. Harris. Whoever uses that will meet with disaster from it.

Mr. Underwood. Mr. Gould is the premium rose man of the country, and I would ask what he covers them with?

Mr. Gould. Well, I cover the most of my roses with sods and earth. But in covering with sods it is not safe to put the grass side down on the rose bush; I have found out that much by experience. There is a good deal of an inclination to heat in the grass, and perhaps, too, a large proportion will be green and a portion will be dry; when there is quite an accumulation, it gets up too much of a heating process for the plant's good, so I would advise to put the earth side of the sod down on the bush or on the plant, and the grass up the same as it grew. I have covered with leaves also. I have taken a good deal of pains to cover roses, the tender kinds, the teas, with dry leaves, and have made a sort of a roof that comes up to a peak and slopes down like the roof of a house. I fill this with leaves and press them together so as to have that as solid and full of leaves as possible. It is considerable trouble to do that where one has a good many of them. They must be left till late in the season — until the tenth or fifteenth of November the past year. Have known people that covered earlier that didn't have any roses the following year.

On motion of Mr. Gray the following committee was appointed to select and recommend a list of roses for general cultivation, to-wit.: Mrs. E. J. Stager, Mrs. Anna B. Underwood and F. G. Gould.

Subsequently the committee presented the following report:

REPORT OF COMMITTEE.

In submitting the following list of roses your committee do so with the remark (in the way of explanation) that our aim in this work has been to make a list not too long, but to include enough of such sorts as would embrace the most pronounced shades of color with some of the intermediate shades, having in mind the importance of the selection of such as have the most desirable qualities, as beautiful color, form, fragrance, freedom of bloom, good constitution, and permanent shade, etc. We can scarcely expect all the good qualities concentrated in an individual variety of any class. Consequently, some are left out that are as beautiful, and perhaps more so, than any in the list on

account of constitutional defect, or other fault. The difficulty of judging between the many grandly beautiful roses, accounts for the absence of many a favorite. Winter protection is recommended for all, even the June roses.

HYBRID PERPETUAL ROSES.

Alfred Colomb — Brilliant carmine crimson; very large, full, and of fine globular form; extremely fragrant.

Anne de Diesbach — Carmine, a beautiful shade; very large, fragrant.

Baron de Bonstetten — Rich velvety maroon; large, full.

Baroness Rothschild — Light pink; cupped form; very symmetrical, without fragrance.

Caroline de Sansal — Pale flesh color; large, full, flat; does not always open well; best flowers late in the season; a lovely rose when perfect.

Fisher Holmes — Deep glowing crimson; large, moderately full, and of fine form.

Gen. Jacqueminot — Brilliant crimson; not full, but large, and extremely effective; fragrant.

John Hopper — Bright rose with carmine centre; large and full; a profuse bloomer.

Marguerite de St. Amande — Bright rose color; very beautiful in the bud, gives many fine blooms late in the season.

Paul Neyron — Deep rose color; good tough foliage; free bloomer; about the largest variety in cultivation.

TEA ROSES.

Bon Silene — Rosy carmine, shaded with salmon; fragrant and very free flowering; valuable for the buds.

Perle des Jardins — A beautiful straw color, sometimes deep canary; very large, full, fine form and free flowering.

Souvenir d'un Ami — Pale rose, sometimes slightly suffused with salmon; very large, full, and highly perfumed.

Sombreuil — Creamy white, tinted with rose; very large.

HYBRID TEA.

La France — Delicate silvery rose color, changing to silvery pink; very large, full, fragrant; constant bloomer.

PERPETUAL MOSS.

Salet — Pink, or light rose color; large; pretty in bud; a true perpetual, and the most valuable moss rose.

JUNE ROSES.

Mme. Plantier — Pure white; above medium size; full; flowers profusely, fragrant, vigorous grower.

Harrison's Yellow — Early; fragrant.

Queen of the Prairie and Baltimore Bell — Climbing; red, sometimes with white stripes, with very slight fragrance; blush, changing to nearly white.

The following paper was contributed by Mr. Nagel by special request:

THE CHRYSANTHEMUM AND ITS CULTURE.

By E. Nagel, Minneapolis.

The chrysanthemum is now the most popular flower of the day; it is rightly called the Queen of Autumn. It rules royally from September till December, in the most gorgeous colors, cardinal and old gold, bright bronze-brown and white as pure as snow, and feathery as ostrich plumes, clear golden yellow, rosy pink silvery gray; no other flower can compare with it for variety and purity of color. No wonder that the admirers go wild over the chrysanthemum shows in New York, Philadelphia, Baltimore and other large eastern cities. To think of the endless varieties and the most gorgeous colors, and oddest shapes, flowers to measure five inches or more across and color as bright as gold, it is certainly the most gorgeous and beautiful flower for decorating and all other purposes for which flowers are used. At the same time it is not an expensive flower, it is the flower for everybody, rich or poor, all alike, awaiting with a good deal of anticipation, when the flowering season of chrysanthemum is approaching.

The popularity of the flower seems to be increasing from year to year in this country, and in Europe. The growing demand in the last four or five years is astonishing. Not very many years ago the chrysanthemum was classed among the most common flowers, and used only in the most common floral work.

And to-day, it is used at the most brilliant receptions, parties and weddings, everywhere where flowers are used, the chrysanthemum is the leading flower in its season.

It is not an exotic which commands a great deal of care and tender treatment; it has some peculiarities, but they are easily learned, and by a little watchfulness anyone can grow them. Their propagation is so easy that a great many florists put them almost any place, because they think they will grow anywhere, and abuse them in the most shameful manner.

They certainly do grow anywhere, but to grow them well they want some care and a good place, like other plants. The propagation is easy, and should be done as early as possible. After they are through flowering they should be cut down to the pot —and they will throw out suckers from the roots around the stem, and when large enough they may be taken off as cuttings and put in cutting bench or divided and planted in small pots at once — one way is as good as the other. January and February are the best months for it, but it may be done later, any month until May, with good results. After the young plants are potted, care must be taken not to let them get pot-bound. As soon as the pot is full of roots they must be transplanted into a larger pot; and they must be pinched back from time to time, so as to give the plants a good shape and make them bushy. The pinching back should be done a few days before transplanting, so as to have them sprout again before transplanting. The soil should be good and rich; compost made of well rotted sods with one-third old cow manure is best. At all times they require plenty of water; they should never be left dry enough to wilt.

In potting, the pots should not be filled too full with earth, so as to leave at least one inch space for water, that is when they are in pots the sizes from seven to ten inches.

In the month of May they can be put out doors, but they must have plenty of sun and air; give the plants plenty of room, so as not to crowd each other; the pots must be sunk in the ground, and the limbs tied to stakes so the wind won't break them, or they may be planted out in the open ground and left until fall, and potted and brought into the house before cold weather sets in; in either case they will flower in abundance.

The main point in growing chrysanthemums is, to keep them growing, and that must be done by giving water freely and transplanting whenever necessary; whenever a chrysanthemum is checked in its growth the result will be crippled flowers.

The chrysanthemums are divided in three classes, the Chinese, Japanese, and Pompone.

The Japanese are the oddest shapes, many of them having whorled centres; others have short blunt centres, petals with long erect outer rows forming a saucer shape; others are partly quilled, each quill is a flat spathe.

The Chinese are more regular in form, many being incurved, others are like full rosettes of narrow ribbon, the petals being slightly reflexed.

The Pompone are very small flowers, very regular, but not very popular, therefore not much grown.

There is an endless variety of them, and every year many new ones added. We had over seventy varieties last season. I will describe a few of the best of them.

Bicolor—Japanese; flat flower of very large size; color red striped with orange; last long in bloom.

Christmas Eve—Japanese; fine white large flower, each petal twisted and curved; an old, but one of the best varieties.

Diana—Chinese; rather dwarf growing, but very free bloomer; centre petals quilled and short outer petals flat; one of the purest white.

Frank Wilcox—Chinese; above medium size; rich golden amber, slightly shaded deep bronze; one of the best for specimen plants.

Lady St. Clair—Chinese; one of the finest white; incurved, soft, and plumy; fine for cut flowers.

Moonlight—Chinese; a grand flower of the purest white; petal like pointed ribbons; one of the best for specimen plants.

Mrs. Geo. Bullock—Pure white flower; slightly incurved; fine for cut flowers.

Mrs. Langtry—Japanese; a perfectly formed flat flower of unusual size and perfection; color, snow white; fine for exhibition.

Robert Bottumly—Japanese; petals long and when well grown half an inch in breadth; flowers often measure six to seven inches in diameter; color, pure white; one of the best to grow for exhibition.

Domination—A grand variety; flowers large and beautiful form; petals slightly incurved; color bluish white; one of the best for specimen plants.

Gloriosum—Light lemon yellow; immense flower; narrow petals, curved and twisted; one of the freest bloomers.

Abdel Kader—Japanese; color deep maroon; petals twisted; a very fine variety.

Elaine—Japanese; pure white; back of petals slightly tinted when old; an exceedingly useful flower with broad petals; very full, extra fine.

Golden Dragon—Japanese; long petals of rich golden yellow, whorled and twisted; fine flower.

Temple of Solomon—Japanese; bright golden yellow; petals twisted towards the centre; large flower and very free bloomer.

There are a great many other kinds equally as good but too numerous to mention; those I have mentioned here, are the very best of the varieties we grew last season. As there is much interest taken in the chrysanthemum, I hope that by next fall we shall see a chrysanthemum show here.

The following paper was read by Mr. Carleton:

SUMMER FLOWERING BULBS.

By Frank H. Carleton, Minneapolis.

No flower garden is complete without a few summer flowering bulbs. They are so easily cultivated and cared for, and are so certain to send up their spikes of flowers every season, as to be deserving of more general cultivation. There is nothing in the flower garden that requires less attention when once planted, and which affords so much beauty as the summer flowering bulbs, whether they be the gladioli, tigridia, oxalis, *amaryllis atamasco* more commonly called the Fairy Lily, the *caladium esculentum* and the canna, which are forms of bulbs proper, or the dahlia, or madeira, or mignonette vine, which, though properly called tubers, yet require about the same general treatment as bulbs. When bulbs are once planted in the spring they are certain to develop and make a grand show, provided they are given half an opportunity.

First and foremost of all these summer flowering bulbs, of course comes the gladioli. It is the lazy gardener's friend. It requires no hoeing, no mulching, no stirring of the soil, but if the weeds are simply kept away it will come along itself, and send forth its gorgeous spikes of flowers which will arrest the attention of every passerby. As a cut flower it is unexcelled. If put in water when the two lower flowers of the spike commence to open, it will last for a fortnight and until every blossom has fully expanded.

A few years ago, at Long Island, as the guest of John Thorpe, the former president of the American Horticultural Society, — the man who probably has hybridized and produced more new colorings of gladioli than any man in this country, who was the first in this country to thoroughly cultivate that queen of autumn flowers, the chrysanthemum, and who has spent many years of his life in endeavoring to produce a yellow geranium, which, with his "gilded gold geranium," he has almost accomplished,— while with him, I saw thousands of gladioli being picked for the New York market. As soon as the two lowest blossoms were about two-thirds opened the spikes were cut with a sharp knife, bound in bundles like bunches of asparagus, and shipped.

So far as can be ascertained the first gladioli was taken as a wild bulb from the Cape of Good Hope, less than a century ago. Other varieties were found wild in other parts of the world, and now about sixty species are found. But the beautiful products of our garden with their varieties of coloring ranging through all shades except blue, are the products of hybridization. New shades are being produced each year,— some of the novelties selling for over five dollars for a single bulb.

How shall a person procure them? They are easily bought— catalogue prices for named varieties averaging from a dime to a dollar each — or what is better still buying assorted shades of the named varieties from a dollar to two dollars a dozen. But they are raised easily from seed, the seed the first season producing little bulblets, very many of which will blossom the second year afterwards. And when a person has a few bulbs to start with they will multiply rapidly. Each year a full grown bulb will form around itself from one to a dozen or more little bulblets, which, if taken up each fall and planted the following spring, will produce bulbs, most of which will flower the second season. Five years ago I commenced my study of the gladioli, commencing with about a hundred bulbs and two packets of seeds. I procured only the named varieties. The spring I planted them I could put all I had in the pockets of my overcoat, but by carefully saving all the bulblets each fall and planting them the next season, I have now in my cellar for next season's planting fully four bushels of the named varieties, and I have supplied several of my friends last season. I presume I have now three quarts of bulblets about the size of peas, which I shall plant next season. The parent bulb dies each year, but it forms a new bulb of equal size each season, and often two, in addition to the little bulblets of which I have spoken.

The bulbs should be planted from three to five inches deep, and not nearer to each other than six inches. For successive flowerings they can be planted as early in the spring as common peas and as late as the twentieth of June. They can be put in as early as the ground can be properly worked, and a spring frost, or even an occasional late spring snow, will not hurt them, as they are very hardy. Avoid planting a second season on the same ground, but plant them anywhere. Stick a few bulbs among the rose bushes and they will make the bushes beautiful after the roses have gone, and if not cut each spike will remain beautiful for a week or ten days, at least. Some of Lemoine's hybrids are truly gorgeous. The gladiolus needs no watering, and will care for itself if the weeds are kept down. I doubt if any soil is better adapted to their vigorous growth and flowering than the average soil of this section, into which should be worked a very little well rotted stable manure.

With many the lily is a favorite flower. Many of its varieties are truly queenly, but the *lilium auratum* is the only one which I have found perfectly hardy. If planted in a sandy soil it will last for four or five years without a division of the bulbs, and increase in vigor each year.

The Lily of the Valley, which we all admire for its beauty and purity, everyone can have. By enriching the soil on the shady side of the house it will grow with wonderful vigor and increase each year.

Next to the gladioli, as a bulb for general cultivation, I would name the canna, by many called Indian shot. Within a comparatively few years a large number of French hybrids have been produced, which are truly splendid and range through various shades of red and yellow. The bulbs increase rapidly; they can be taken up each fall and kept in the cellar as easily as potatoes, and are as easily planted in the spring.

For large beds and lawn decorations they are unrivaled. Their companion bulb, which forms an excellent border or edging for them, is the *caladium esculentum*, which, although flowerless, yet with its immense long and broad leaves gives a tropical appearance to any garden or lawn. The caladium bulbs are also easily cared for and kept, and require but little attention, when once planted, beyond keeping the weeds down.

Of the amaryllis family, the *amaryllis atamasco* or "fairy lily" is the only variety which I have found to succeed well in ordinary garden soil with average cultivation. This is a beauti-

ful flower, which increases rapidly and is an accession to any garden. The bulbs can be treated the same as the gladioli. The blossoms are of two colors, — a pure white and a delicate pink.

In this paper the bulbs of which I speak are only the late spring or summer flowering out of door varieties. I therefore pass over the tulip, hyacinth, crocus, and narcissus. Of these the tulip is too well known to require comment, — more than to say that for intensity of color it has no equals, — while the hyacinth and narcissus generally require better attention than the amateur can usually give them.

But I must not omit to speak of a grand section of bulbs which are of rare beauty and which are very soon destined to become general favorites. I refer to the tuberous rooted begonias. These, although similar in leaf and flower to several of the begonia plants, are yet very different. The bulbs, which are to be planted out each spring, are about the size of a twenty-five cent piece and flat, about half an inch thick. They are genuine bulbs and not plants, the foliage dying down each autumn, when the bulb is to be taken up and kept through the winter in a dry cellar. The colors range through various shades of red, yellow and white. When planted in the late spring, in rather a shady place where they will get moisture, they commence blossoming when very small and continue through the entire summer, giving a flower and foliage which are unique and beautiful, and of such delicacy of coloring in flower and leaf as to harmonize with the most delicate flowers like the heliotrope and carnation or the most delicate tea rose. I would recommend all amateurs to try a few bulbs, for they make a choice bouquet or corsage flowers.

Asparagus tenissimus is a comparatively new bulb, of the same family as the common garden asparagus, but it has a delicate and beautiful foliage, fully equal to smilax, and it is easily cultivated.

Of the dahlia — the favorite of our grandmothers — I will not take time to speak, more than to say that no bulb, except it be the gladiolus, has responded more beautifully to cultivation than this. It was discovered in Mexico by Baron Humboldt in 1789 — just a century ago — and by him sent to Madrid to Prof. Cavanilles, of the Botanical Garden, who gave the genus the name of dahlia, in honor of the Swedish Professor, Dahl. From the single, common variety have come by cultivation the various double flowers with the many shades of crimson, purple, white,

yellow, orange, and scarlet. No blue has yet been obtained, although efforts have been made to produce it. But Nature seems to be invincible to the rule, that there shall be in nature no single family of plants in which blue, yellow and scarlet in varieties of the same species shall be produced. In many varieties of plants we find two of these different colors, but in none are all these found. Dahlias are easily raised, but they require a deep, rich soil, and the side shoots should be vigorously pruned, so as to throw the strength of the plant into the main stock.

There are two other flowers of which I wish to say but a brief word; and these are roots and not bulbs, but they are rare garden ornaments, and are entirely hardy. I refer to the *clematis Jackmanii* and the hollyhock. The hollyhock has been marvelously improved of late. The old single varieties, which many of us associate with our early homes, are striking and attractive, but the new varieties, as double as a dahlia and of a variety of shades, are an ornament to any home. I had a row of the double varieties last year which attracted so much attention as to almost cultivate vanity. Passers by would stop and gaze at them, and many would ask to come and look at them, and beg a blossom. They require but little attention, and will send up their tall stalks higher than the tallest man, and for home and church decoration, when brilliancy is wanted, will compare with the gladiolus. The Japanese single varieties, with the odd markings, are also easily raised and are very striking.

There are other summer flowering bulbs and roots of which I would speak if time permitted, but those which I have mentioned are all practicable for the amateur to raise, and amply repay the little attention which they require.

Now, in closing, let me add one single suggestion. Although there may be some little outlay in the original cost of bulbs, yet, after all, bulbs are in the end among the cheapest of nature's gifts. They will live from year to year, producing their own kind, and one outlay covers the entire cost; while many annuals have to be raised or bought new each year, and the outlay has to be made over again each season. Let me ask each of you, who care for flowers, to plant in the coming season, at least a few gladioli, tuberous rooted begonias and hollyhock, and I believe that none of your plants will give you as much enjoyment as these bulbs and roots.

The paper of Mr. Carleton was greeted with applause, and on motion of Mr. Terry he was tendered a vote of thanks.

No report was made by Prof. Oestlund as entomologist, although present at the meeting. He sent the following explanatory note:

LETTER FROM PROF. OESTLUND.

UNIVERSITY OF MINNESOTA,
GEOLOGICAL AND NATURAL HISTORY SURVEY,
MINNEAPOLIS, MINN., Feb. 27, 1889.

S. D. Hillman, Secretary, etc.,

DEAR SIR: I did not prepare any report or paper this time with intention to have it published. As I supposed Prof. Lugger would present an elaborate paper on the subject, and with the hope that I could slip out of the responsibility of serving as your entomologist, I only wrote out a few notes from which I intended to speak extempore to the Society.

But as you have again honored me with the position of entomologist, it shall now be my earnest endeavor to do some special work during the year for the Society. All along I have felt the want of some elementary work on horticultural entomology adapted to our locality to put in the hands of our members — a work simple enough to be understood by all yet comprehensive enough to present the subject in all its importance and serving as a basis for observations and practical work. We do not care so much for learned and scientific papers on the subject, which are but little understood and I think will rather retard and increase the interest for the subject. But this want is easier to state than to fill, and I know that my own knowledge and experience is not up to the task; yet with the resources that are at hand in the entomological work of the experimental station, etc., I think it is going to be possible to do something in this direction during the year. I have no plans to submit in detail at present, but you can expect to hear from me further on.

It is with much pleasure that I have watched of late the rapid increase of interest for the subject of entomology in Minnesota, and I hope that this will continue as it has begun. There are reasons why Minnesota should take the lead in this work as it is already doing in other directions.

Yours truly,

O. W. OESTLUND.

The following paper was read by Prof. Pendergast:

THE NEW SCHOOL OF AGRICULTURE.

By Prof. W. W. Pendergast, St. Anthony Park.

The primary object of the Minnesota State School of Agriculture is to bring together as large a number of the intelligent and ambitious farmer boys of the state, as the resources of the institution will permit, for the purpose of giving them a scientific, practical training in the elementary principles of agriculture, horticulture and allied industries to the end that these pursuits may be conducted with greater skill and judgment, and that they may be helped forward to the high position in public esteem and honor which of right is theirs.

For the successful accomplishment of these objects a somewhat extended and thorough drill in certain branches not bearing directly upon the cultivation of the soil seems to be essential.

First—The mind of the student must be strengthened and prepared by proper discipline, to grapple with and finally to master the perplexing problems that will be continually coming up for solution as he advances in the line of work marked out for him.

Second—As a foundation for the intelligent prosecution of the studies for which the school was organized, there must be a knowledge of the principles which underlie them, and without which the time spent upon the desired branches would be wellnigh thrown away. Agricultural chemistry, for instance, might seem to call only for a knowledge of the few elementary substances which enter into organic life, but this knowledge can not be attained by one who is entirely destitute of general chemical discipline. The same is true of veterinary science, entomology, the theory of plant growth. In short, of every branch of scientific agriculture.

The requirements for admission into the state school are necessarily moderate in order that its benefits may be brought within the reach of the average farmer boys, for whose improvement it was designed.

If the standard could be so raised, as to require at least a year of training in the natural sciences before entering, the work of the school would be more complete and satisfactory, unless we take an extra year at the beginning of the course for preparatory work. The foundation on which our boys are to stand should be as broad and firm as possible, and the parent makes a great

mistake, who decides that because he intends to give his son a specific education, he shall not have any general culture to build on.

It will be the aim of this school then, to give a good general disciplinary education, by a systematic study of the natural sciences which are necessary to the pursuit of the arts of life, particularly those of farm life, and by the practical application of them to those arts.

The sciences to which especial attention will thus be given are physical geography, philosophy, chemistry, botany, veterinary and physiology, all to be brought home vividly to the understanding of the students by illustrations and experiments, for which the chemical and philosophical apparatus, the farm, the garden and the green house will furnish ample facilities.

It is recognized that the great and crying need of the agriculturists as a class is not high scholarship, but a liberal education along those lines which are necessary to a proper understanding of the principles upon which successful farming depends.

The paramount importance of this kind of an education seems to be better appreciated on the other side of the Atlantic than with us. In Germany, France, Belgium, Switzerland, Sweden, Austria, Holland, and Denmark, agriculture enters into the regular normal school curriculum. In all Europe there are not less than 10,000 schools in which this science, as well as horticulture, arboriculture and kindred pursuits, is taught.

It is gratifying, however, to note that in this country each succeeding year is marked by increased attention to the demands made upon it by the tillers of the soil, for the simple reason that each year affords new evidence of the wisdom of what has already been done in this direction.

There is a constantly deepening conviction in the minds of practical business men that the exigencies of the times demand provision, at the public expense, for a specific education in certain industrial lines, not solely with a view to furnishing our school boys and girls with a sure means of obtaining a livelihood, in case the uncertainties of the future may drive them to it, but that they may, while yet in a plastic state, receive the impression that skill in manual labor is something worth striving for, possession of which will be valuable in proportion to proficiency, and as honorable as valuable. A general training of this kind will inevitably bring about an increased respect for honest industry. For students will naturally look up to those who stand

highest and take first rank in the operations in which they themselves are engaged, and the world will honor them for having attained a position which assures them the surest and most reliable source of profit.

Now, though it must be admitted that agriculture is the one essential industry which underlies all others and makes civilization itself possible, though its successful prosecution demands better judgment, more consummate skill, greater practical ability and more exact knowledge of the natural sciences on which it is based than is required in any other avocation, yet, strange to say, it is the only pursuit for which no special preparation is deemed necessary, or, at least, none made.

The successful farmer is one who by patient study has solved the problem of economical production; who has learned to so systematize and plan his work as to make every blow count one toward the final result. He must understand the character of his soil and know what crops it is best adapted to produce, and if it is not up to the highest standard he must be able to ascertain what elements are lacking and the best and most economical method of supplying them. In short, scientific knowledge must be invoked at every step to aid him in the general management and improvement of his farm, and to assist him in eliminating the elements of failure and mastering the principles upon which, and upon which alone, successful farming can be carried on.

In view of what has been said it may be readily inferred that the great object of the state school of agriculture is to furnish a sound and substantial education in the basic sciences just mentioned. This will be just as valuable viewed in a disciplinary light as can be obtained elsewhere. At the same time care will be taken that the education so given shall at every stage point toward the farm, and be of such a character as will enable the students to accomplish greater results with less labor than would have been possible without its aid. The end kept constantly in view is to develop the thinking powers and strengthen judgment rather than to fill the mind with a vast store of miscellaneous facts which will never be put to any practical use. As a basis of thought certain important truths must be grasped.

From these the student by the aid of his reasoning powers, will make deductions, not only valuable in themselves, but which will still further develop the mental faculties thus brought into healthy exercise. Conclusions thus obtained will make decidedly

deeper impressions than if learned by rote from the teaching of another and will be far more abiding.

The great desideratum is the production of clear headed independent thinkers, able to reason logically and arrive at correct conclusions; ready to analyze critically, discriminating between gold and glittering dust, between what is true and what is merely specious; who can from daily observations and known facts, make sound generalizations, with minds alert and judgments keen.

It seems hardly to require any argument to show that these results should, if possible, be accomplished and the minds of the students thus disciplined by vigorous exercise along those lines which they are to follow in after life. Let us take the young man who is fitting himself for the profession of civil engineer to illustrate the point. Now, while it may be admitted at the start that the thorough literary and classical course would be of great value in quickening his mind and strengthening his judgment, yet it is no less true that the special qualifications essential to his success in his chosen calling and the particular kind of judgment and mental strength which he must possess in order to attain to the highest degree of perfection, or in fact to succeed at all, could only be acquired through the medium of geometry, trigonometry, surveying and other branches of mathematics. It is with this idea uppermost that the plan for our agricultural school has been laid, and the young men there engaged in fitting themselves for future usefulness upon the farm are working in conformity to this plan. They are bright, intelligent and ambitious. They entered the school with the fixed resolution to do its work thoroughly, faithfully and cheerfully. The success with which this resolution is being carried out is a surprise even to the instructors, though their expectations at the outset were very high. The attainments of the boys upon entrance were found to be below the desired standard, but in industry, application, and manly deportment they are far above the standard which had been mentally set. The most noticeable thing about them is the straight-forward, earnest and dignified way in which they go about their work. There is no "foolishness" about them. In study hours it is all business, and even the intermissions are devoted chiefly to reading and the preparation of their lessons. They evidently believe with Dr. Franklin, that "A little leisure is time to do something useful." At 5 A. M. the earliest risers begin to make their appearance in the reading and

study room. At 6:30 A. M. the whole house is astir. At 7 A. M. comes breakfast, and at 7:40 A. M. the regular school work of the day begins. This is kept up until 4 P. M., when those who desire to reduce expenses by assisting in the necessary work about the building, in the greenhouse, or on the farm, take an hour or two for this purpose. Monday being a holiday, is similarly improved. In this way they earn from 50 cents to $2.50 per week. The cost of board, including washing, has averaged, so far, about $2.75 per week. Judging from present appearances, this school will, in the near future, if sufficient room be given it in which to expand, become one of the best patronized institutions in the state.

A few months ago the great question to be solved was, "*where* shall we find our students?" Now it has taken a different shape, and the troublesome query which is awaiting an answer is "what shall we do with the boys that are coming to us for instruction?"

On the eighteenth of October we began with seventeen students. In two months that number has more than doubled, and nine new applications have been received and accepted. The "Home" is full. The nine can be housed at the experimental farm house, but "still there's more to follow." What shall be done with them?

The following report was then read by Mr. Grimes:

MEETING OF THE AMERICAN HORTICULTURAL SOCIETY AT SAN JOSE, JAN. 24, 1888, AND FRUIT GROWING IN CALIFORNIA.

By J. T. Grimes, Minneapolis.

Mr. President and Fellow Members of the State Horticultural Society,

LADIES AND GENTLEMEN: California has a great future. To begin with: Its development, commencing with the old Mexican rancho; its cowboys and immense herds of cattle, grown principally for their hides. We pass on to the breaking out of the gold fever excitement in '49, when thousands rushed in to reap a golden harvest, or disappointment, the alternative in most instances. The old forty-niners were as whole souled, open hearted and generous people as ever lived. The uncertainty of their occu-

pation, their very surroundings and mode of life made them dependent upon each other, aside from any consideration of fortune, luck or educational advantages. We here mark the second period in the progress and development of the country, and in its civilization from the time of the semi-barbarous cowboy to the rough hospitality of the miner in his camp. Like a panorama, the scene has again changed; the large herds of cattle have disappeared from the plains, and the miners have mostly forsaken their camps; the plowshare is now turning its long furrows, and wheatfields almost beyond limit have taken the place of those pasture lands to the extent that their products have ruled the markets of the world. But now comes another change in the scene before us; the wheatfields are giving place to the orchard.

There is nothing small about California. Our friend Jordan used to tell how many thousand fruit trees he had in his orchard, but some of the orchards in California have as many acres planted out as Jordan ever had of trees. I can not make a comparison of the capability of fruit growing in that country here, without showing the disadvantages we possess, from the fact that the very fruits they grow to the greatest perfection and profit we can not grow at all.

Then what have we to do with this matter, anyway? Much, my brother; do not forget that this Society is a small branch of that great river, that leads to the market ocean of the world. Our discussions should not be confined to a narrow channel, but give us all the advantages we may be able to draw from the experience of others as well as ourselves. While we can not grow pears and plums for one dollar and twenty-five cents per one one hundred pounds, or grapes for fifteen dollars per ton or make wine for twenty cents per gallon as is done in California, we grow many kinds of fruit with fair success and small fruits in great abundance and get good prices; we are less troubled with insects than our neighbors over the hill and do not have to depend upon irrigation for our crops.

In the discussions at the horticultural meetings at San Jose the fact was brought out that the nearer to their northern limits fruits were grown the more perfect the specimens were found to be, and it was not a matter of surprise that Minnesota should be awarded first premiums on her fruits at our great national exhibitions.

There are some things which at first sight may seem remote

and yet may have a direct bearing upon our success. For instance a heavy, rich soil in California is of little value for either the production of raisins or wine. The best vineyards are located upon gravelly soil—some of them upon gravel almost entirely. The grapes grown in such soil are much sweeter and ripen earlier.

Some facts may also be learned in regard to irrigation. The southern portion of the state produces the largest and finest looking fruits, while the northern section produces the same fruits but of less size and better quality. The reason is obvious. South of a line that may be drawn direct from Monterey Bay to Sacramento City their crops have to depend almost entirely upon irrigation, as rain seldom falls between the months of March and November, while north of that supposed line they generally have sufficient rain during the season to produce a crop. Hence we find the fruits from along the Sacramento, and other northern valleys within the moist belt, upon the market at San Francisco a week or more in advance of those produced five hundred miles further south. Oranges, peaches, pears, prunes, apricots, etc., are ripe at Oroville as soon as they are at San Diego. The same is also true in regard to the time of blossoming. The difference is perhaps entirely on account of irrigation, and while it has its advantages it also has its disadvantages, not only upon the quality of the fruits and their time of ripening, but upon the health of the people as well, on account of the miasma produced by the overflow of water.

You ask me if the fruit business in California is not likely to be overdone, and what bearing it will have upon the horticulral interests of our state and upon the eastern markets? I answer, no! the more they can produce the better for us. They have an almost unlimited market and very little competition in their line of goods, which consists largely of oranges, lemons and dried fruits, such as we can not produce and yet must have. Just think of it! We have been buying those goods east and shipping them from New York, while we occupy a half-way station between the point of production and that from which we receive our supplies. Fruit in the eastern states is dear and always will be. We think the time has about come, when we should receive our supplies direct from the producer and save the double railroad freight and the intervention of that long line of useless appendages called middle men. To illustrate my meaning in regard to the costs and profits under the present sys-

tem of trade, it is only necessary to state that the so-called California wine houses in Minneapolis that profess to sell a pure unadulterated article of wines at bed rock prices, charge from $2 to $2.50 per gallon for wines which I was informed by one of the principal wine makers of Napa Valley, Cal., could be made profitably at from 15 to 20 cents per gallon. The grapes cost them from $15 to $18 per ton, which is the usual price, and they realize from 20 to 25 cents per gallon for their wines at wholesale. I do know, however, that the business is immense from the size of the vineyards and wine houses which we saw almost everywhere in California. At Vina, where our excursion halted to see Senator Stanford's place, there are over 3,500 acres in vineyard with a winery attached, having a capacity of 1,500,000 gallons. There were in stock at the time over 600,000 gallons of last year's vintage.

Horticulture in California may be classed under three separate heads or divisions, viz.: First, the growing of grapes; second, of citrus fruits; and third, of deciduous fruits, and no one pretends to pursue more than one branch of those industries. It stands us in hand as much to look after our needed supplies of fruits as it does to procure a market for our own products. Having glanced at the wine industry by way of illustration (for I take no stock in it, believing it to be a greater curse than blessing), I proceed to notice more particularly the class of deciduous fruits.

Minnesota consumes annually a large amount of canned and dried fruits, and it is a satisfaction to know that they are produced so abundantly, and at so small a cost as to place them within our reach.

The largest orchards perhaps in the state are those around San Jose, in fact the county may be said to be one entire orchard. Most of them contain several varieties of fruits, but some plant largely of only one or two kinds for a special purpose. Near Walnut creek, in Conta Costa county, I saw a young orchard of three hundred acres, all in Bartlet pears. At San Le Andro, in Alameda county, there is an orchard containing ten acres of cherries, the finest trees I ever saw, all of them of the Gov. Wood variety. The fruit is used at the canneries. Most of the canned goods were formerly put up under the brand of Lusk & Co., of San Francisco, who really were the purchasers and not the producers. Very little in proportion is shipped to the eastern markets fresh as gathered from the trees.

Next in importance to the canning business are the drying establishments. The one I visited at San Jose had a capacity to handle forty tons of green fruit per day. The process in drying prunes and some other fruits is first to dip in hot lye, then rinse, then place on platters in the dry house about four hours, then change to the open ground, in the sun, where the process is soon completed.

The worthy President of our Society requested me to give some kind of report of the American horticultural meeting held last winter at San Jose. I can only speak from the most pleasant recollections. The meeting of the society was most happily conceived, arranged and carried out, and royal guests could not have received a more hearty welcome than did the disciples of Flora and Pomona upon this auspicious occasion. We met there for the first time as representative horticulturists from all the states east of the mountains, and shall I say that we there found much in little; better far, we found much in much, and much more.

I shall not pretend to give any detailed account of the society's transactions; they are already published in book form which anyone can procure by sending two dollars to W. H. Ragan, secretary, Greencastle, Ind., who will send you the volume and enroll your name in the list of the honorary members of that society. If you are a growing scion of progressive horticulture you will have more than cause to thank me for these suggestions.

I can truly say that the hospitality of the people of California is unbounded and which can only be compared with the state itself which is more than a thousand miles long and twice as wide if the journey had to be made east or west on foot. But then we did not have to walk, they carried us wherever they wished to have us go. We were the guests of the railroads and of the cities and towns wherever we went and none of our party seemed inclined to go anywhere else. Our meeting at San Jose was one not to be forgotten. Every preparation had been made for our reception, entertainment and enjoyment.

We were first taken to their homes (every body seemed to be keeping open house) and made to feel that they were our homes as well.

The meeting was formally opened on Tuesday, Jan. 24, 1888, at 10 o'clock A. M., Hon. Parker Earle, president, in the chair. But I shall omit any details of the proceedings of the meeting for reasons already given.

The citrus fair and horticultural exhibition were in progress here during the time of our meeting, to which each member of our society received complimentary tickets through the courtesy of the manager, President Jones. If any of you Minnesotians could have been placed unawares in the midst of such a collection of fruits and flowers you would have supposed you were lost in Paradise. All the varieties of citrus and deciduous fruits, fresh, dried and otherwise, grains, nuts and vegetables, products of every sort and kind, gathered as it were from every country and clime, and yet principally grown in the valley of Santa Clara, California.

But the crowning feature of our entertainment was the banquet gotten up by the ladies of San Jose on the last evening of our meeting. Words would fail to describe; it was simply immense, superb, perfect, whatever those terms may mean.

The next morning carriages were in readiness, according to previous arrangement, to convey us into and over the country round about, where we were shown the immense orchards, vineyards, dry-houses, and the entire modus operandi of successful fruit culture, from the planting out, the kinds mostly planted, the manner of cultivation, pruning, irrigation, gathering of the fruit, taking care of it, marketing, etc.

When looking over this vast extent of country, devoted almost entirely to orchards, I felt like exclaiming, "Oh! Santa Clara, thou art a jewel in the crown of California."

We next proceeded on our northern excursion. Tickets had been generously furnished to each member of our party by the agent of the Southern Pacific Railway, Mr. J. B. Lanck, and the program of our journey announced, which would extend a distance of several hundred miles through the most fertile valleys of Northern California.

By way of Monterey we next found ourselves at Oakland, where another banquet was in waiting to receive us, or rather we were there to receive it. These banquetings furnished grand opportunities for speech making and nut cracking, and with the usual ride around, passed off very pleasantly. The next morning we started on our northern trip proper, an army of horticulturists, fully 200 strong, prepared to capture everything before us. The first place of attack was Napa, famous for its wines, and the trophies here won consisted principally of bouquets and ladies' smiles, followed by a most sumptuous banquet for a second course. After the usual speech making we were taken to the

insane asylum, located near by, an institution with about 1,450 patients. They claim to have another similar institution of the same kind located somewhere in the state, so it would seem that a great many people become crazy after they get there, if they never were before.

From here we marched to Sacramento city the capital of the state which we captured and the great seal of the state was surrendered into our hand. he best of everything the city could furnish was provided and spread before us, the tables were arranged with an array of tasty fruits and beautiful flowers. The banquet was spread in the hall of representatives and was served without wine showing in the whole arrangement the good taste and refinement of the ladies of Sacramento.

The next morning we marched forward on the wheels of our elegant sleepers, past Marysville to Oroville on the Feather river. This is about the centre of the old placer mining district and the country round about has been dug up and much disfigured by mining operations. It is also the northern limit of orange orchards in this state. We now return to Marysville where we were again banqueted with the usual ceremonies which are indispensable upon all such occasions; thence we proceed to Chico which lies on another branch of the road. Here I saw some fine native black walnut timber, the first I had seen. Here are also some very fine orchards belonging to Gen. Bidwell who seems to own the town and pretty much everything around it. This is one great drawback to Northern Carlifornia; the lands in many instances are held in very large estates.

Passing Vina of which I have already had occasion to speak we make our next attack upon Redding at the head of the great valley where we marched to conquer the great banquet which was here spread before us. A little more speech making (though some of us were too full for utterance), and we retired for the night with old Mount Shasta standing 14,444 feet above our heads or rather above the level of the sea as a sentinel placed on guard duty for the night.

We now returned by way of Red Bluff, making Woodland the objective point, where we were welcomed to another sumptuous entertainment followed by the usual little neat stereotype speeches prepared by our nut crackers for the occasion. But perhaps we are distributing our chestnuts too freely. It may be accounted for, however, on the high wine pressure of the spontaneous mo-

ment. But this is said to be a democratic country and we are all Jeffersonians.

Eight P. M. finds us back at headquarters at San Francisco, where, upon our arrival, we find that we are under marching orders for to-morrow morning. An excursion had been planned to carry us up through the Santa Rosa valley and also for a steamboat ride out through the Golden Gate the next day. Our equipments were at hand early the next morning and we took the boat across the bay to where the train was waiting to convey us north as far as the great red wood forests, where are seen some of the largest trees in the world only excepting those of a similar species, the *Sequoi Gigantea*, found growing in Miraposa county. Some of those trees are between two hundred and three hundred feet high, without any large sized branches, and as straight as an arrow. The stump from which the plank was made and which was exhibited at the centennial in 1876 we found to measure twenty-one feet in diameter clear of the bark. Under the brave leadership of the ladies in command we soon had stormed its heights and stood conquerors triumphant beneath the banners, and in the name of the American Horticultural Society.

We now return to Santa Rosa where carriages, a banquet and a host of friends are waiting to extend a hearty welcome; but I will not particularize. Our line of march has been one constant innovation; the ladies have done themselves proud; our victories have been complete, and we have carried away many trophies which we shall hold in lasting remembrance.

We go to San Francisco for the night, but to-morrow morning return to San Raphael upon the invitation of Hon. Wm. T. Coleman, at whose hands a bull's head breakfast is to be served complimentary to ourselves and in remembrance of the days of the old regular forty-niners. What a bull's head breakfast was, anyway, no one could even guess, and we felt the more anxious to lay ourselves open for an attack. The early morn again found us in line, and by forced marches we were soon upon the ground where carriages, hacks, what-nots, and everything that could be called into requisition were in readiness to convey us wherever our presence was most needed. We formed in procession and commenced our march with Mr. Coleman in the lead, who seemed anxious to show it all. So we rode around to the east side of the town all the forenoon, and those of us who had come expecting a ten o'clock breakfast were a little disappointed to find that the morning ride had occupied the time till one o'clock.

But at last we returned to find our breakfast waiting, and soon our seats were occupied at the table. Our host then informed us that he had prepared a regular forty-nine breakfast for our special benefit, and introduced the head cook, who stood up in greasy buckskin, and in a way befitting the occasion, explained the manner and skill required to get up such a breakfast. Next came the speech of welcome by the host, and in response a few chestnuts were cracked by some of our worthy members.

Our breakfast consisted of seven bull's heads with red pepper sauce, baked beans "a la mode," peppered chowder, Spanish stew, chicken and red pepper, meat balls, half pepper, Spanish rolls and California wines, which last I suppose was added by way of luxury.

Our long fasting and ride had given us an excellent appetite, so we leaned forward and devoured our repast promiscuously without noticing some little peculiarities mixed up in the cooking.

After dinner came the regular toasts and every nut cracker of our party declared that they had never seen anything to compare with the breakfast given by our host. When we were at San Jose we thought we had found it, at Sacramento we thought we had found it, at the various places where we had been entertained we still thought we had found it, but right here at San Raphael we know we have found it. This was a most supreme moment. We could only suppress our risibilities by thinking the Lord's prayer.

Our host proved to be equal to the occasion for on our emerging from the dining hall we found the carriages all in line waiting to convey us over the west half of the town. Mr. Coleman, again took the lead, and we in all courtesy were bound to follow although at the sacrifice of our contemplated ride out through the Golden Gate.

Mr. Coleman claimed to be a true Democrat and nothing would do but we must see it all, so we rode and rode until at last we pulled up at a beer garden and all were invited to alight and "take" something. We now fouud ourselves completely outgeneraled and the enemy taking advantage of the situation made bold to charge our lines and spike a few of our guns.

What effect the foaming lager may have had upon the still wines in a horticultural point of view the world will never know.

The reading of the report was greeted with hearty applause.

The meeting then adjourned till Friday morning.

MORNING SESSION.

FOURTH DAY, FRIDAY, JAN. 18, 1889.

The meeting was called to order at nine o'clock by President Elliot.

The following paper was read by Mr. Dartt:

ORCHARD PROTECTION—FACT AND THEORY.

By E. H. S. Dartt, Owatonna.

This subject of orchard location and protection must be getting somewhat stale. We have been told so frequently that the orchard should be placed in a high, airy location and be protected by trees, and also by an intelligent and energetic man, that it would seem useless to plant an orchard in any other location, or for any other kind of a man to attempt to raise an orchard. But there are certain phases of this subject that seem worthy of consideration.

There is an orchard near Owatonna that is favorably situated and has been planted out ten years. The trees were set twelve feet apart each way—the owner believing that trees thus planted would naturally protect each other, and that if they did well they could be thinned out, and if they did poorly, the less ground covered the better. On the east side is a single row of European larch trees; on the south and west, a row of box elders on the outside, with a row of Scotch pines on the inside. These trees are now about 20 feet high. Scotch pines are also set 60 feet apart all through the orchard. The east part of the orchard is entirely Duchess, and of the row standing 12 feet from the pines on the south side of the orchard, 16 trees are standing in fair condition, while only 2 are dead. In the second row, 24 feet from pine trees, 13 trees are standing and 5 are dead. In the third row, 36 feet from pines, 12 are standing and 6 are dead. In the fourth row, 48 feet from pines, 7 trees are standing and 11 are dead. The next three or four rows are similar to fourth row. Then slightly higher ground is reached, and trees are in better condition. These facts seem to prove that while partial shade is very beneficial, yet these beneficial effects do not extend much farther north than twice the height of the windbreak. From these results we might expect

to find the trees standing on the north side of the pine trees scattered through the orchard in much better condition, than those on the south side, but careful inspection shows no material difference. And we conclude that it is a mistake to set isolated trees as has been done in this orchard, and that continuous single rows of evergreen trees—rows to be about four rods apart, and run east and west, or, perhaps, a little to the northwest and southeast, would be far better. For this inside protection I think Norway spruce an excellent tree, as it would soon become tall, and if set eight to ten feet apart in the row, would soon effectually shade a wide space. Cottonwood trees would hardly do, as they would soon monopolize the whole ground and starve out the fruit trees.

It may not be amiss here to ask a question or two, with a view of eliciting discussion: What killed these Duchess apple trees? Our friend Gaylord, of Iowa, will promptly answer sun-scald. All right, so far, but what causes sun-scald? Here is room for theory. If we put our hand on a Duchess apple growing on the south side of the tree and exposed to the hottest August sun, it will feel cool. It is alive and the principles of life convey the power to resist death, or those conditions that produce death. If this apple falls to the ground and is exposed to the direct rays of the sun for an hour or two, it is affected by sun-scald. It is dead now, and death having deprived it of all resistant or protective power it falls an easy prey to sun-scald or other disease.

This life principle which we call vitality, tenacity of life, or hardiness when applied to trees, is strongest in plants and animals in perfect health. And although certain diseases, such as blight in trees, are most likely to attack individuals of robust habits, yet the general rule holds good. Disease is but a modified degree of death. We would hardly expect a consumptive to stand the fatigue of a long march and if he fell by the way we might say he died from sun-stroke. But we would feel confident that it was the seeds of death previously planted in his system that had rendered fatal attacks of disease so slight that they would have been successfully resisted or warded off by a robust man. So it is with our apple trees. In our severest winters some of our trees are frozen so dry that they never burst a bud, but most of them are so hardy that, though seriously injured, they start into growth in the spring. Now, if in June we examine some of our standard varieties that have just squeezed through, we will find a thin white film growing over and covering the dead, blackened

wood underneath. This new cambium layer may be no thicker than writing paper, but it is there and it proves that a struggle is going on in that tree as in all trees, and all living things between life and death — life seeking to build up and death seeking to destroy. In this particular case the scale seems so evenly balanced between these two opposites that it is not at all strange that such trees die from sun-scald or other trivial cause, not likely to affect a sound, healthy tree.

We have heard about tempering the wind to the shorn lamb. We can certainly temper the winds and the heat of the sun to some extent by tree plantations. Now, if we can leave the fleece on the lamb (the cambium layer is the fleece) by not allowing our trees to overbear, and by the liberal application of manure to bearing trees, and by supplying just the kind and amount of shade needed, then certainly we *deserve* success.

DISCUSSION.

Mr. Barrett said there was an orchard near Brown's valley that was in good condition, although in the hands of a careless farmer. The trees were located near the lake and there was protection afforded by timber.

Mr. Dartt. Trees in our section generally, wherever southern protection is afforded, are doing much better than those a little removed from that protection. I have several instances in mind where this rule holds good; there are Wealthy trees of considerable size that have stood quite well and have produced good crops of apples. They are in the kind of location I have described, having a southern protection, with considerable of a slope on the northern side. They are in what we call in Minnesota a favorable location. This southern protection is a subject worthy of consideration.

Mr. Frankland. I have been somewhat interested in this subject lately and more perhaps in the paper just read than any other, as it seems to apply to my circumstances. However, I want some explanation as to the conclusions arrived at, from the practical experiments Mr. Dartt has made. It seems to me rather anomalous that trees nearest a southern protection are prevented from dying with frost; I would think the northern trees would be in the most danger. The west and northwest being protected, as I understand, it preserves them; whereas I should think the north breezes from Manitoba would come down and scorch the

trees right off. It would seem that if the sap freezes it would become more and more solid, and when the sun thaws it out and the bark begins to split, sunscald would set in. We think it is the effect of the sun in March that kills the trees.

Mr. Dartt. My theory is that the extreme cold kills the tree, or it becomes almost dead. It is then in the condition of a very sick man; it needs care and nursing. This protection on the south side affords a shade and a protection from the effects of the extreme heat of the sun. These extremes of heat and cold have a bad effect on trees. They may stand one extreme, but if exposed to both it may prove too much.

Mr. Pearse said in the winter the moisture was constantly passing off, and it was the starch which supported the life of the tree.

Mr. Frankland. Is there an evaporation from the trees all the time?

Mr. Pearse. All the time; unless trees are very large and the proper amount of food is supplied, in our long winters the trees become exhausted and when the starch is gone the tree dies from starvation. I have examined the wood with a microscope. The south side of the tree will be entirely exhausted while there is a supply of food on the north side.

Mr. Barrett. What is your remedy?

Mr. Pearse. Select trees that have a capacity for storing food. Southern trees are not prepared to stand our winters as they do not have the proper cell structure. Trees have to store up nutriment for several months, and need to be fed the same as animals.

Mr. Dartt. If the trees haven't enough food stored up how are they going to get it?

Mr. Pearse. During the growing season there isn't one particle of nourishment stored up; it all goes to the growth of wood and fruit. This laying up of food for winter supply commences after the growth of wood is done.

Mr. Dartt. Do you say there is no life in the tree in the winter?

Mr. Pearse. Yes, there is. Vegetation commences in the spring; life commences in the spring. In getting hardy varieties, we must get those that are capable of storing up food sufficient to run them through our long winters.

Mr. Frankland. My trees came through the Manitoba winter last year and it got down to forty degrees, and the glass got discouraged; we couldn't tell how much further excepting with a spirit glass; but there was no protection excepting a mound of

earth. This last fall, some time the latter end of October, we had a pretty sharp frost. I suppose it came pretty near to zero. About the fifth of November I begin to mound up those trees to protect them for winter; that is all the protection I give them.

Mr. Underwood read the following paper:

SEEDLING APPLES.

By J. M. Underwood, Lake City.

In opening the discussion of the topic, Seedling Apples, I would urge, first, the importance of enlisting the interest of our farmers, their wives and children in the search for those kinds of fruits, and particularly of apples best adapted to the Northwest. When we reflect that every apple we have ever known or seen, had its origin as a seedling, it will not seem a new or uninteresting field for us all to experiment in.

It is not common to think or speak of the Baldwin, the Spy, the Bellflower or the Talman Sweet as seedlings, as their names, with many others, have become so familiar that it would seem that they must have always existed, and yet it is not many years back to the time when many of our choicest apples were originated among a pack of seedlings, growing in nursery rows, or, it may be, sprung from the seed of some choice apple eaten at the fireside under the parental roof, where they were saved and taken to a distant home and tenderly planted and cared for, mainly for the loving associations connected with their origin. Perhaps long years elapse before the public generally are aware of the results, but at last they are incorporated in the pomological records of our country.

Of course, to us who are familiar with the subject, it is perfectly clear, but I believe a majority of our people do not understand the exact origin of the apple. It is possible that the energetic missionary, sometimes called the tree agent, has fully explained all the mysteries connected therwith, but I will at least venture to say that the variations in the growing of apples from the seed, is so great that no two seeds ever produce exactly the same variety of tree and fruit, hence to those who like variety, it is an interesting field.

It is also a well established fact that the pollen of one tree in blossom will fertilize the blossoms of an adjoining tree, thereby

imparting, in a measure, some characteristic of each to the other. So, if we can secure in this cross-fertilization, the combination of hardiness and color in one, with that of flavor and keeping qualities in the other, we may reasonably expect once in a while, to make an advance in the right direction. This fact must not be lost sight of, however, that the chances are about one in 10,000 of obtaining a desirable result, consequently we need to enlist the co operation of every man, woman and child in the state to make that progress which our condition demands.

With wise and enterprising forethought, our Society has planned to stimulate this endeavor by offering liberal premiums to encourage work in growing seedlings, and, since all are really seedlings and the most progress we have made has been from that source, I am quite inclined to think it is the direction from which is to come our best results. Think of the seedling we call the "Wealthy;" thousands of bushels have been raised in our state already. It captured for us the Wilder Medal at Philadelphia and placed us among the foremost at New Orleans, and while it may not be the apple that we are looking for, it has attracted the favorable consideration of the foremost pomologists of our land. Then look at the improvements that have come to us through seedlings in our list of crabs or hybrids, as we call them, giving us better flavor, larger size, and longer keeping qualities. There is now rising in the horizon, other candidates for favor; seedlings of the Duchess are prominently and favorably mentioned by our Seedling Committee, to which we look for improvement in hardiness, flavor and keeping qualities; I refer to the Okabena, originated by H. J. Ludlow and controlled by the Jewell Nursery Co., of Lake City, Minn., and the Peerless, originated by J. G. Miller and controlled by O. F. Brand, of Faribault.

In connection with this subject, let me refer to an orchard of seedlings in which we have become interested, growing at Grundy Center, Iowa. The history of it is briefly as follows: During the days of our civil war, J. S. B. Thompson left his family, as many others were doing, while he went into the army to serve his country. His wife, in the mean time, visited her parents in New York. While there her father brought her the choicest apples from his large orchard of seedlings, to pare and dry for her western home. With keen forethought, she saved the seeds of the best, and took them with her as well as the dried fruit.

They were planted in rows and cultivated until large enough to transplant, when about three hundred were set out in orchard. The soil is a rich black prairie loam with a clay subsoil, inclining a little toward the south, and on the southern edge of the orchard is a strip of low, almost marshy ground, through which runs a small stream of water. On the north, east and west sides of the orchard is a large willow hedge that has grown with the trees, and which in a measure protects the fruit from being blown off by the winds.

And here in this orchard, to-day, are upwards of one hundred of the finest apple trees that a man ever saw. The fruit is quite varied as to size, color, flavor and season. After a large experience in Illinois, in Michigan, as well as twenty years of orcharding in Minnesota, I must say that this is the most wonderful orchard I have ever known, comprising as it does, so many large, excellent, sweet, sour, red, yellow, and green varieties. The most wonderful features of this orchard, however, is the fact that while in the large extent of territory, around it, where the Wealthy, Duchess and Whitney have been planted and have all died out, even in this same orchard, these new seedlings are growing, strong and vigorous, and bearing large crops of apples. These apples have been exhibited at many of the fairs in Iowa, and have always taken first premium for their size, beauty of color and delicious quality.

Some of the trees have attained a large size, being 12 to 18 inches in diameter, and from 25 to 35 feet in height. We have cut from some of these trees this fall as high as 360 scions, 10 to 18 inches long, which I think a good indication of their hardiness. This orchard is growing only one hundred and eighty miles south of here, and in a large prairie district, which is a pretty good guarantee that some of them, at least, will prove of value to us in Minnesota. In conclusion, then, as we think of what Mrs. Thompson has done by saving the seeds of those apples away back twenty-five years ago, and planting them in her new home on the bleak prairie of Northern Iowa, may we not all be stimulated to follow her example and reasonably hope for ultimate success in finding something desirable for our reward?

DISCUSSION.

Mr. Dartt. I would inquire where the seeds of Thompson's seedlings came from?

Mr. Underwood. In the vicinity of the Hudson river. The

exact place I cannot tell. These apples are grown at Grundy Centre, in the central part of Iowa in the third or fourth tier of counties.

Mr. Smith. It is the highest point of land to be found in the central part of that state.

Mr. Cutler. I would ask if there are not other orchards growing in that part of the state?

Mr. Underwood. Yes; but they have met with the same fatality as other orchards in this state. I think there is nothing there that compares with them in point of hardiness and vigor at the present day. They were grown from seedling trees, or so reported to me.

Mr. Poor understood they were grown from choice apples. This was an important subject. He believed it the best plan to rely upon seedling trees so as to get a good tap root which would penetrate the ground as far as possible. But it was important to depend upon grafted and budded trees for our orchards. Seedlings as a rule could not be depended upon whether of the apple, plum or peach.

Mr. Brand thought the paper contained an important lesson as it explained why trees were killed so much throughout the Northwest. This orchard of Thompson's was on damp soil and the roots of the trees were probably standing in water. The great destruction of trees in 1884 was caused by a warm fall and late flow of sap. He cited a case where trees stood near the St. Joe river, some of which were over a hundred years old. Some of the trees stood only four feet above the level of the river at low water.

Mr. Sias thought it was a mistake to suppose the cause of mortality of trees was due to root grafting. He had been experimenting for twenty-five years and had as high as 20,000 seedlings at one time that were destroyed, although the tap roots of the trees were in perfect condition. It was the tops that were killed. He did not find one of the lot not hardy enough among the seedlings so far as the roots were concerned. He had many hardy Russian varieties grafted in the same manner, but they didn't have the long tap root; trees would die anyhow if too tender, whether seedlings or not. They must have the right variety and then it would stand the test. Every tree had a peculiar habit of growth. Haas, for instance, had an upright, rapid growth; if the top was cut off it would sprout up again, and the root corresponded largely with the top. If the habit of a tree

was to go down deep it would not be easy to change that habit.

Mr. Pearse. A tree will not grow if not hardy, whether it has a tap root or not, but seedling trees are the longest lived. My experience is, the only varieties we can depend upon are those that are hardy.

Mr. Frankland. I would like to ask Mr. Underwood how many of the Thompson seedlings are as hardy and of as good quality as the Duchess?

Mr. Underwood. There are very few trees standing in the orchard that are not of good quality, and there are over three hundred planted. There are perhaps sixty or seventy that have indications of hardiness and good quality sufficient to recommend them for propagation.

President Elliot. How many of them do you consider worthy of propagation?

Mr. Underwood. Well, we are just investigating the thing thoroughly, and may have a higher appreciation of them now than we will after awhile; but we are grafting some seventy-five varieties now. I wouldn't want to warrant them all to be superior to Duchess, or anything of that kind. I simply bring this matter before you, gentlemen, calling your attention in this direction, asking you to watch them carefully and to see if anything comes out of them. The point made by Mr. Brand that the trees are living where the roots have moisture could hardly be a good one, because on that same ground the Duchess, Wealthy and Whitney ought to live that have been planted in the same orchard.

Mr. Brand. I meant that was one reason for their hardiness.

Mr. Frankland. What do you know of the hardiness of these trees?

Mr. Underwood. All the trees these apples came from on exhibition, are hardy and vigorous — all of them. Some varieties are long keepers; some sweet and some sour.

Mr. Frankland. Have any particular efforts been made to keep them?

Mr. Underwood. Mr. Thompson has no way of keeping apples better than a small dugout cellar; he hasn't even a good cellar to his house. Most of these apples came from his place since we have been in session here. A few of them I had at my place that were simply wrapped in paper and kept in the cellar.

Mr. Philips. In Wisconsin I will say they are about in the same relative condition regarding the discovery of new hardy

varieties that will withstand the severities of our northern winters as you are here in Minnesota. As one of a committee appointed by our state society three years ago to investigate the Russian apples as grown in our state and Minnesota, as to quality and hardiness, and also to discover if there are any good winter varieties, I had hoped to gain some valuable information at this meeting; but though there has been for years past a fine, creditable and beautiful show of Russian apples at the state fairs of Wisconsin and Minnesota, for the past ten years in attendance at the winter meetings of both states, I could carry all the Russian apples I have seen at both places in a bushel basket. We usually have — as you have here — a fine show of native seedlings, which still shows they are ahead. They must be recognized and their cultivation encouraged until something better is found. The best twenty years of my life have been spent in apple growing. I have raised in a single year 1,000 bushels — half of them winter varieties. The past year all the apples I stored in my cellar for winter use were the product of seedling trees — one of which has borne twenty-one consecutive crops, the other fourteen crops, but the young trees of neither are good enough to recommend; still I keep setting them — for my own use — and will do so until I find something better. Continual planting is the only way to produce fruit for the family.

Mr. Brand. What is the character of the soil and how far are the trees standing from water?

Mr. Philips. The trees are in a limestone soil and stand some five hundred feet from running water.

BRANCH SOCIETIES.

Mr. Barrett then offered the following resolutions:

Resolved, That the state be divided into four horticultural districts, to be known as the Northern, the Southern, the Eastern and the Western Minnesota Horticultural Districts, and societies duly organized therein.

Resolved, That to make these missionary labors a success, the legislature be memorialized for an appropriation of $1,000, giving to each district the equal sum of two hundred and fifty dollars, said money to be put into the hands of the treasurer of this Society, to be drawn upon the orders of its President, countersigned by its Secretary, and audited in its accounts.

Resolved, That the transactions of the district societies be incorporated in the annual reports of this Society.

Mr. Sias. This matter was brought up at our meeting at Rochester, as Mr. Harris will remember, and he favored the project. He is a man that has done more for this Society probably, than any other member. He is the Marshall P. Wilder of the Northwest. I have heard that remark frequently, and as he favored it, and was placed on the committee, I thought it would not be tabled or carelessly put aside.

I might compare this Society to the century plant, which I understand grows very fast and after it blossoms, dies. It comes to be a large tree in its native habitat in Mexico. I have understood in some cases it attains a height of sixty feet, then blossoms and dies. Perhaps the reason is because it has no branches.

Now, for fear this Society may die prematurely, I recommend these four branches, which I think we need, one from the north to protect from the arctic waves that come down so severe. I think we have an agent running a station at Moorehead, who would be a good man to run that one. We need one on the east to protect us from eastern tree frauds that come here; we need one on the south to protect us from the direct rays of the sun—to prevent sunscald. We need a good, heavy branch there, and we have already got it started—about a year ago. Then we need a good, heavy branch on the west, near the border line, where Prof. Barrett lives. He is a man that believes in evergreens and forestry, and we need a good strong branch there to protect us against the tornados that sweep across those prairies. We need it to protect this beautiful city, and he is just the man to run it. We need all those branches. This Society might live without them, but it may die suddenly or prematurely some time without them. We need these branches just as much as they need them in Iowa. All we ask of this Society is to sanction this measure. We want a committee to memorialize the state legislature. We ought to organize these societies and do the best we can. We must not give up the ship, but let us fight for success.

Mr. Dartt said money was required to carry forward such an enterprise, and he favored the societies if they could be kept up. It was necessary that somebody should do a great deal of work for nothing, or to have the money to provide the sinews of war. It was not very likely that a state appropriation could be obtained, but perhaps one hundred dollars could be secured for each society. He had tried to start a society at Owatonna and succeeded in getting a few members, but it soon dwindled out.

He said it was a reliable tree when they allowed suckers to grow at the roots of a tree, it would absorb the vitality of the tree. If that were true, perhaps this society should not encourage many suckers.

Mr. Franklin. These are branches and they ought to be encouraged. This money is needed to keep these organizations together; it is a necessity. This society ought to ask the legislature for enough so they can give these outside societies some encouragement.

Mr. Silas. I don't know as it is the best thing to compare us to suckers. A sucker is not the best tree in the world. I don't think Mr. Dartt ever gives us anything, but he gives us some things we can't understand. He told us a year ago that the box elder was failing in Minnesota, although he was the only man I think that knew it. I looked his place over, and while I would dispute anything he says, I think he is making a mistake in comparing this committee, of which he is one himself, to suckers. If the century plant had some suckers there would be some life in the plant. This Society must have branches.

Mr. Fuller. I would ask if the century plant has any branches whatever.

Mr. Silas. I think at the top it has.

Mr. Fuller. Oh, no.

Mr. Silas. What do you get your flowers from?

Mr. Fuller. It has a large branch, however.

Mr. Silas. I helped to organize this Society and I think this work of establishing these branches just as important. They will do just as much good as this Society has done or can do. It will bring in an interest over all parts of the state. We don't intend to ask for help from this Society, to have any more than enough means to run itself, and I would not consent to that. But we propose to start these branches and get this help if we can. We will let them die when we are obliged to, and not before.

Mr. Dartt. I simply said the box elder was doing poorly on poor ground.

Mr. Silas. I understood that it was failing.

Mr. Dartt. It will be a short-lived tree and not worth much.

Mr. Harris thought the Society should receive $1,000 or $1,500 more than at present, in order to aid in establishing local societies. The Forestry Association might be merged into this Society as that association has no active organization at present.

Col. Stevens thought the state had been very liberal with the Society and would not be apt to increase the appropriation at present. If they asked too much they would get nothing. He favored an appropriation for the Forestry Association. When this Society had no funds and wanted to be represented at the meeting of the American Pomological Society Mr. Elliot and Mr. Mendenhall furnished the money from their own pockets.

Mr. Cutler thought it was premature to ask for an appropriation for something not in existence. It would be better to wait till they were organized.

Mr. Barrett said he felt some delicacy in saying much for the resolutions, he having introduced them, but thought the demand for $1,000 a modest one. They had a promising local society at Browns Valley but he could not afford to pay all its bills much longer.

Mr. Pearse thought the time had not arrived when the appropriation could be asked for.

Mr. Gould moved to refer the matter to the legislative committee. The motion was adopted.

The committees on prize essays presented reports which were, on motion, adopted.

PRIZE ESSAYS.

Your committee on best essay on orcharding in Minnesota by young men under twenty five years of age, would respectfully submit that the five essays on that subject have been put into our hands, and we have given them a careful and full consideration, and would recommend that the premium of twenty five dollars offered by this Society be equally divided between Edgar D. Sias and Archie M. Brand as we have been unable to decide upon their respective merits, as both seem to be of equal value to the orchardist. We would further suggest that persons receiving special premiums for essays at any time should be excluded from competing for the same premium at any future time, and that a first and second premium be offered.

While we would encourage our boys and girls without distinction we would like to give all an equal chance and the three essays before us which we have excluded as not being equal in merit

contain many excellent suggestions, and with a little more study and experience those boys will be able to write a very instructive and valuable essay upon that subject, and no doubt eventually become valuable members of the State Horticultural Society.

J. T. GRIMES,
J. M. UNDERWOOD,
B. TAYLOR,
Committee.

ORCHARDING IN MINNESOTA.

By Edgar D. Sias, Rochester.

Honorable Judges and Gentlemen of the State Horticultural Society:

Of the delights of the orchard it is not necessary to speak. Thereof have bards long since sung their lays and tree peddlers recited their pieces. My purpose is to tell how to secure these delights in Minnesota. Let us follow the successive steps which one must take to attain the desired end. Naturally, the first thing to consider is

LOCATION.

Repeated experiment has shown that our apple trees do best near the lakes, other circumstances being equal; that is, latitude, slope, windbreaks, etc. The climate is usually more equable, the soil better, and perhaps above all, the best feature of such a location, is the moisture. Droughts are among the greatest of obstacles we have to overcome in growing fruit in our state. Besides these general principles of location, such as latitude, elevation and relation to large bodies of water, one must, for a model orchard, select a north or northeastern slope, with a windbreak on the southwest. The soil must be suitable. Avoid a sandy subsoil. A clay loam is good.

VARIETIES.

Having decided upon the situation, we have next to consider what varieties of the apple, plum, etc., are adapted to this climate. We have also to determine which are the better, home-grown trees, which are thought to have become in a measure ac-

climated, or trees imported from other states; and also to learn what age the trees should be. Upon these three things hinge much of our possibility to succeed. As for varieties, we must give up all hopes of making a long lived orchard out of old eastern sorts. "Experience is a good school," and if anyone has had experience in horticulture it is the veterans of Minnesota. Then what better way is there to settle the question of varieties than to follow their list for "general cultivation," which has been culled and reculled for over a score of years? It is true that experiments are going on and apples being produced which show signs of sterling qualities in the last few years, but let their worth be thoroughly tested before hazarding much upon them. Then I refrain from offering the names of any of my "pets," but just say that the Duchess, Wealthy, some of the Anis, Transparent, and many other Russian families of the *pyrus malus* can be raised with profit; but they are mostly fall, or, at the best, early winter apples.

The Grucheoka seems to be the hardiest of the late-keeping Russian varieties, which have been tried at the State Experiment Station. The Transcendent, Hyslop, Whitney and Minnesota are crabs or hybrids, commonly grown.

The Weaver and Rollingstone plums can be successfully raised. The verdict in the state report ought to be final; for it will include decisions from all the experiment stations of the state, among them the State University Station near St. Anthony Park, the newly created experimental station at Owatonna, and Mr. Gideon's at Excelsior.

Notwithstanding all the untiring efforts which the horticulturists of the state have made to obtain a first class late keeping winter apple, the ideal is not yet produced and the opportunity is still presented to someone to make himself immortal in the horticultural world. The best way I can suggest to win this laurel is to plant seeds of the very best late keeping varieties of the common apple and await results. Care should be taken to know from what variety the seed was taken and by what variety fertilized. If this little pains were taken much of the mystery about the seeming freaks which arise from planting seeds would be explained. Then, whoever starts an orchard, let him also start a seed bed at the same time.

In setting an orchard do not stake all your fortune on one variety; that would be like a farmer seeding his land to just one kind of grain. The farmer must diversify his products in order

to be sure of something every year. And so it is with orcharding. But don't go to the other extreme and have a very large number of different kinds, for some will be quite sure to be of no value. It is all right for experiment to try one or two trees of fifty or a hundred kinds, but for profit I would recommend about three varieties, each of the earliest, autumn, early winter and late winter sorts. In this way one will have apples to sell all the season and they will not ripen all at once, thus giving time to dispose of them.

PLANTING.

Having determined on location, varieties and the proportion of each to plant, the trees are the next in order. Obtain trees which are thrifty and well ripened in the fall, and burn root and branch for the winter, taking care that no straw is in the vicinity to attract the mice. These trees should not be over four years old and two to three years old are considered preferable by some. The holes for the trees in the orchard should be about twenty feet apart each way. Dig the holes in the fall and let the frost act upon the soil in the winter. Make them good and large and in the spring fill in again, setting the trees a trifle deeper than they stood in the nursery. Lean the trunks a little toward the direction from whence come the prevailing winds. Then in a few years the tree will gradually straighten up and having become thoroughly rooted can resist the strong winds, thus adding much to the welfare and appearance of the orchard.

While the tree is being started it will stand a considerable amount of fertilizing, and especially in a dry soil the tree should be pushed a little when it is young, otherwise it is liable to always remain stunted. This rapid growth should not have been done in the nursery, however, because it lessens the ability of the tree to stand transplanting. Care must be taken not to cultivate or mulch the young orchard so late in the season as to protract the growth and not have time for the ripening of the terminal buds before winter sets in. The tree should always have a fine dressing spread around it for several feet, but none banked up against it, for it is liable to heat and scald the trunk, which has caused the death of many a tree.

CULTIVATION.

For the first six or seven years the land can and should be planted to some kind of garden truck. Potatoes are good for

well plowed, spring and fall, till the trees are at least ten or twelve years old, to get the best results. Besides keeping the soil in good condition this destroys countless numbers of harmful insect. A coating of straw about a foot thick on the ground is said to be an excellent mulch for an orchard and it keeps the soil very moist.

PRUNING.

The trees should be headed rather low in this state to give them stability. Have the lowest limbs so the horses can walk along pretty close to the trees when plowing. Prune the trees well in June or in the fall and always keep them trimmed; it adds much to the look of the tree, the apples are easier picked, the limbs do not gall each other and the fruit will be much more highly colored and without it makes the tree itself much more healthy. All webs found in the branches should be removed at once and burned, and no offenders allowed to escape. In some orchards the trees can be protected from rabbits by placing a piece of tarred paper about eighteen inches high loosely about the trunk. In one of the finest orchards I have ever visited, the trunks of the trees are bound with rails. This prevents any injury from the rabbits boring or any gnawing by animals. These rails are fastened together and are easily removed twice a year, when the trunks are given a sulphur wash to prevent any insects and prevent any coming up the trunk from the ground. Of course the injury done by flying species can not be thus dispatched. The arsenic emulsion given in Mr. Riley's report last year is perhaps the best spray for the tops of orchard trees.

CULTIVATION.

Such has proved to be the case. Late in the winter, or early spring and fall, webs removed as soon as discovered, and in short no pains spared to keep the trees thrifty and sound. The result is a success and the gentleman has not only good crops of apples, but they are beautiful and free from worms, which is saying

much for this decade of fruit-growing, so we see that advantage in location is not all; great care must be exercised, but the reward is many fold and it must be a source of great pleasure and gratification, as well as profit, to the person, who, in spite of so many barriers to be removed, produces a conclusive evidence to the inscription on the banner which will head the triumphal march of horticultnre in this state — which banner is:

> We *can* raise apples in Minnesota.

ORCHARDING IN MINNESOTA.

By Archie M. Brand, Faribault.

In writing upon this subject we take it for granted that the members of the Society for whose consideration this essay is composed, are well versed in the art of horticulture, and consequently write more on a line suited to the wants of the amateur, rather than those of the professional.

The first thing that comes to our mind after deciding to plant an orchard is—what is the best locality or site to plant upon?

To one without experience the natural conclusion would be a good southern slope, where the trees may have the full benefit of the sun's warmth. But experience has taught us that here is where we "miss" it, if we are allowed to use the expression. Go into any orchard where the trees have attained to any size and have received no southern protection; you will notice that while the bark on the north side of the tree is firm and healthy in appearance, that on the southern side will be found warped, cracked and in many cases decaying. From this we would naturally conclude that it was the sun and not solely the cold, severe winters that is doing the mischief.

Such has proved to be the case. Late in the winter, or early spring, the warm rays of the sun beating upon the tree, stimulate a heavy flow of sap during the day, which is frozen at night and as a consequence ruptures the sap cells in the bark, thus leaving it in a condition easily acted upon by the elements of decay. No, we will not take a southern exposure, but on the contrary

choose a northern one, if possible. But in this case, as in most other things, we must be governed by circumstances. We are not all favored with northern slopes upon our farms, but if there be one, even a very slight one, that is the site to choose. For in this slope we not only have our orchard so situated as to allow to a certain extent of a natural protection from the sun, but also have it more favorably situated than it would be if placed upon a level plat, to the extent of its natural drainage, something very important as regards future success with fruit trees.

A sandy soil is the poorest possible soil for fruit, and if possible such an one should be avoided. Apple trees need an abundance of lime in the soil, and sand is very poor in this element. If trees have to be planted in such soil, the holes should be dug very large and filled in with suitable soil well mixed with crushed limestone and bones, if obtainable.

High land is preferable to low land, but we must not become discouraged if we are forced to take land naturally holding a great deal of water. It may not be ill placed to cite a little of one's observation at the Faribault Nursery. There are small belts of trees growing upon all imaginable soils and locations. The majority of these trees are Duchess. The finest bearing Duchess on the place, and there are five hundred more or less of them, are to be found upon soil where as late as the middle of May of any ordinary spring, you have to dig from but two and a half to three feet in depth to obtain plenty of water. In fact until late in the spring the place is so saturated with water as to form a perfect bog. Here upon these trees grow as fine apples as anyone might wish to see. Large apples, uniform in shape and finely colored. Apples that will command a market anywhere.

A garden or dooryard should never be selected to plant trees in for while in the one case there is not room enough for good cultivation, in the other, we are liable to allow the trees to grow up to grass and weeds, a certain death to the fruit tree.

Now, that a site is selected, the next thing is to prepare the soil for the trees. This may be done by successive deep plowing and harrowing until the soil becomes fine and mellow.

Apple trees should be set in rows twenty-five feet apart and about eighteen feet in the row.

From thirty to thirty-five years of experience has now placed the honest tree dealer in such a position that he finds himself able to recommend without hesitancy, certain varieties of apples that are sure to prove successful if properly handled. The farmer and other persons interested in fruit growing, but not professionals, have by this time learned to shun the fine plate book or cans of preserved fruit of the southern or eastern man, and to look to the trees of their own state for success.

There are but few varieties that we can raise profitably, and of these the old Duchess stands at the head of the list, it being grown over a greater extent of territory than any other variety in the state, and although from time to time new varieties have been brought forward as rivals, still they have long since passed away and left the Duchess master of the field. And who would seek for a finer apple for baking than this?

As a winter apple the Wealthy stands at the head, but it can only be grown in favored localities. Of the newer sorts the Peerless and Itasca, seedlings of the Duchess, are well worthy of mention.

In choosing trees for an orchard of a hundred, one could not do better than to choose in the following proportion: Seventy-five Duchess, seven Wealthy, five Tetofsky, five Whitney, three Transcendent, two Early Strawberry, three Meader's Winter.

This selection is based upon the following facts: Beginning with the Early Strawberry, which ripens about the first of August, we have fruit ripening up until we come to the Meader's Winter, which should be picked late in September. Then we choose the seventy-five Duchess because we can sell their fruit. So few crabs are chosen on account of their commanding such low prices, and the above number of trees are enough to satisfy the wants of any family. Of the new varieties we say wait until they have been tried before you invest.

WHAT TREES TO SELECT.

It would be best if possible for one to go to the nursery himself and select his own trees, but it is not convenient for most people to do so. So they must resort to the next best method and purchase their stock from some good, reliable tree man. Here it might be well to add that trees for Minnesota use should be purchased from nurserymen living within the boundaries of

healthy two-year-olds. Select medium sized stock, trees having good bushy tops, and but one body, for trees that crotch near the ground are very apt to split during our heavy wind storms, after which they are worthless. Medium sized trees are more liable to have good roots than large trees of the same age. They will also be more liable to live after being transplanted, and prove as such roots are apt to rot, and by so doing, make ironclad.

As far as early bearing is concerned we know that a small thrifty tree with plenty of good roots when planted will be a good bearing tree long before a large one of the same age, with mutilated roots, has shown the least sign of a fruit bud.

A great deal has been said upon the subject of when to get trees, some preferring spring while others like the fall, the fact the practice of procuring trees in the fall is becoming more and more general as each season demonstrates its wisdom. It is a more favorable time than spring, because of the cooler and less fickle weather, and the lighter pressure of business with nurserymen, the freighting company and the planter. And while our severe climate will not admit of fall planting, the trees, etc., may be procured in the fall and thus be on hand at the proper moment in the spring. It is not that the trees were dug in the fall that caused their dying, but often through want of proper care on your own part. Through carelessness, want of time or other causes, young trees when received at the delivery ground are too often left exposed to frost or drying winds. As an inevitable result, the planter loses a large per cent of his trees that with but little trouble might have been saved.

Do not fail to be at the place of delivery on the day specified by the man from whom you get your stock. Bring plenty of damp straw and old blankets to wrap the roots up in that they may be kept moist. If the trees are in good condition heal them in immediately, but if somewhat dry it would do no harm to let them remain in a tub of water over night, and also sprinkle the tops.

They may be healed in by digging in clean plowed land a hole two feet deep and the length of the longest trees. Lay the trees in the roots a little lower than the tops, and cover with six inches of good well pulverized clean soil. On this place a board, then

fill the hole rounding full with dirt. After the ground is frozen a little, cover over with straw to prevent freezing. Early in the spring lift up the tops of the trees, leaving the lower half still in the soil.

About the first of May is the time to plant. The first thing to do is to dig the holes. Do not be afraid of getting them too large. Dig them large enough that the roots may in no way be cramped, and deep enough that the tree may set from three to four inches deeper than it stood in the nursery.

Before planting trim off all roots that have been mutilated, as such roots are apt to rot, and by so doing, make the tree sickly and retard its growth. Place the tree in the hole leaning towards the southwest on a slant of thirty degrees. Spread out the roots well that they may not only grow in their natural way and have a large tract of soil to derive sustenance from, but that they may also act as a brace to the tree against the twistings of our storms. Manure should never be placed in the holes under the roots of trees, as it is apt to give the tree a very rapid growth which can not ripen up before frost and consequently will be winter killed. Only damp and mellow soil should be used, and plenty of water, say from a pail and a half to two pails to a tree. So much water is used to settle the earth firmly about the roots of the tree, and saves a great deal of tramping, and by settling the earth about the roots leaves no room for small spaces being left, which would eventually allow of the roots drying up. Never water the trees after the day of planting, as the water, acted upon by the sun, only crusts the surface of the soil and does not penetrate to the roots. A far better plan is to place a quantity of short wet straw about the tree, about six inches in depth, and covering a circle about the tree with a diameter of from five to six feet. This will keep in the moisture and at the same time save a great deal of unnecessary labor.

CULTIVATION.

Do not as is the general custom plant trees in a hay field. If a man desires fruit for himself and family only, and is indifferent as to the time he gets it, and indifferent about the quality and quantity, then he may plant his trees in grass land and keep them in that condition; but if he intends to make the business of fruit growing a dependence for his living, he would hardly be satisfied

to wait from twelve to fifteen years for results that might be obtained by good culture in seven or eight years; nor would he be likely to be pleased with the moderate returns from common or inferior fruit, while his neighbor was receiving high prices for a superior article grown on ground where fruit was the only crop.

It is true that there are soils so rich, that culture would give trees an excessive growth, and not only postpone fruitfulness, but make them liable to be injured by severe winters.

One great advantage of having the ground under culture is, that it enables the orchardist to give his trees a more uniform growth without regard to condition or unfavorable seasons.

If his trees are loaded with fruit or the season unusually dry, a more frequent stirring of the surface will generally keep up the desired vigor, but if the trees are in grass and the season very dry, he is powerless to help the case, and can only watch and worry to see his trees fail to grow, the leaves turn brown or yellow, and the fruit drop for want of sustenance. No, we will start in as if we meant business and cultivate as if it were any other field crop. Plow as deep as possible, harrow well and then plant the trees.

For the sake of protection it is well to plant the trees in rows running northeast and southwest. This will allow of the shade of one tree protecting the body of the next during the warmest part of the day. Begin to cultivate as soon as the weeds start but do not come closer than three feet from the trees so as not to allow of the whiffletrees scraping the bark from the bodies; keep the cultivator going until the first of July among young trees but not after the middle of June in any orchard where the trees are old. Be careful not to plow deep among old trees so as not to disturb the surface roots. After you have stopped the cultivator go in and mulch heavily among the trees, which will keep in the moisture and not permit the weeds to grow.

MULCHING, MANURES, ETC.

It is well for us in Minnesota to mulch our trees well, as a heavy mulch will keep the frost in the ground until late, thereby retarding the opening of the fruit bud so early that it is apt to be nipped by late frosts, and also the early flow of the sap, and in this way protects the trees from sunscald. As early as it is safe and the ground becomes dry enough to admit of cultivation, remove the mulch and cultivate for an early growth. But in

spreading mulch never let it come within a foot of the tree, on account of mice. Cornstalks and begasse are probably the best mulches, with coarse swamp hay, clover, or straw next in order.

As regards fertilizers, wood ashes are probably one of the best things that we can obtain. Wood ashes contain all the required elements of plant nutrition, except nitrogen, and are very rich in potash and lime, the principal constituents of the apple tree. About fifty bushels should be used per acre, but care should be used not to allow the ashes to come in contact with the tree trunk, or they will eat the bark off and destroy the tree. Manure from stables is also good, and should be liberally sprinkled through the orchard every year, while the carcasses of dead animals placed under ground several feet from a tree pay well for the trouble of placing them there, although in case of a well being anywhere in the vicinity, the latter method should not be resorted to.

RABBITS, MICE, BORERS, CODLING MOTH, ETC.

Of the many pests that the orchardist has to contend with it is probably well to speak of a few. It makes the heart of the orchardist sink away down below the zero point when on walking through his orchard on some fine winter's day he perceives great patches of bark gnawed from some of his trees, or entirely girdled and nearly spoiled. He knows this to be the work of the rabbit or mouse. If he wants to save his orchard he must set about to exterminate his little foes. In the case of the rabbit one of the best methods is the use of the figure four trap baited with sweet apple. Cabbage leaves and turnips are also good. The rabbit, being very hungry and smelling the tempting bait loses all fear of the huge trap and creeps under to his doom. He has but to nibble a little at the bait, the triggers are sprung and bunnie lies at the mercy of his captor. A more handy way but at the same time a more dangerous one is to stick little pieces of apples containing strychnine on little sticks. These sticks are then stuck in the snow deep enough that the apple is left about six inches above the snow's surface. The rabbit eats the apple, is poisoned and generally may be found in the morning where he partook of the fatal fruit. The little mice are harder to destroy on account of their size and numbers. In the winter time they are to be found under the snow where any litter, such as grass and weeds, have been allowed to remain. Therefore all such

should be removed from around the trees before the ground freezes. They will also work at a tree surrounded by heavy snow, eating the bark off the tree just where it leaves the soil. To prevent this go among the trees and tramp the snow down solid about the trunks and their operations will cease. They may also be headed off by going among the trees in the fall before the ground freezes and placing several shovelfuls of dirt around the bodies of the trees. But in case the mouse gets the start and does his work first, a good remedy is to bank up around the injured parts with damp earth as soon as the ground thaws in the spring.

Where the rabbit and mouse do their work above ground, and a pretty neat job while they are at it, we have one less manly, namely the pocket gopher, who in an underhanded manner, follows his occupation beneath the surface among the roots of the tree. His presence may be detected otherwise than by his mounds of dirt, by the bark of the tree becoming yellow, the leaves wither and droop and the fruit being small, shriveled and worthless. The steel trap or strychnine put in potatoes and the holes are among the best means for destroying him.

Another pest in the orchard is the borer, probably the greatest one in regard to the tree itself that we of the Northwest have to contend with, that is in the presence of hickory or poplar timber. The eggs which produce these borers are laid by a beetle in the bark of the tree. By closely examining the trunk and large limbs if eggs are present a slit, instantly recognized by the experienced eye, a mere scratch about an inch long, is to be seen. This is where the eggs are laid and if they have not been hatched, the pressing upon the bark under which they lay, with any hard substance will crack the eggs and consequently save further trouble. But if the eggs have hatched the young grubs must be found and destroyed. As soon as hatched the young grubs begin to gnaw into the bark of the tree. Their presence may be detected by their refuse which is shoved out through the opening made by their entrance, which being of a glutinous nature collects around the edge of the hole, resembling very fine chewed pine wood, is yellow in color and instantly detected by the experienced eye. One way to destroy the young grubs is to take a sharp knife and peel off the dead bark around the hole and underneath which he is working, where he may be found, but this method is objectionable on account of having to expose the inner part of the tree to the atmosphere, and should not be resorted to, unless the injured part may be immediately smeared over with wax

While a safer method is to inject water into the hole and drown the grub or by running a copper wire in and probing about until you have killed him.

CODLING MOTH.

Now we come to the codling moth which is more high-toned than his fellow knaves, and for his part takes the fruit itself. If we want apples that will sell, and such as we would wish to eat, apples perfect and uniform in size, we must fight the codling moth. Now while this moth or its young could do more damage than all the other pests combined, still the method to prevent its ravages is the most simple of all. Take a barrel of water and into this stir one-half pound of Paris green. With this mixture sprinkle the trees just as the blossoms are beginning to fall and repeat in about two weeks. Use about a pailful to an average sized tree.

When the orchard has become old enough not to be hurt by hogs turn a few in. They will eat all the rotten and poor apples that fall to the ground, keep the soil rich and well stirred up, and also keep the weeds down. But never let cattle into the orchard as they will do more damage in one day than you could remedy in a year.

All worms' nests found among the branches of the trees should be removed and the worms killed, which may be done by placing the nest on something firm and stamping upon it with the heel of the boot.

PROTECTION.

You must begin to look to the protection of your trees from the time they are planted. Plant a good windbreak of evergreens all about the site chosen. For this purpose the American White Spruce fills the bill. It not only makes a fine, solid bottom, but its top is generally close, and if the trees be planted six feet apart, in fifteen years from time of planting they will form a solid breastwork, six feet through and twenty-five feet high against the snow and wind. The trees next best suited for this purpose rank in the following order: Norway spruce, Scotch pine, white pine, etc. If nothing else can be had willows are better than nothing; also any of the deciduous trees. But do not plant them so they will stand less than four rods from the apple trees. If nearer, the snow lodged will break the trees

while small, and their roots will take much nutrition from the soil needed by the apple trees. Never trim for beauty. Hardiness is what we are after. Cut off all limbs that rub each other; all dead ones, and remove all blight. In all cases immediately cover the wound with wax. A little trimming may also be done on the north side of the tree to throw the growth to the south side as a means of protection. In closing, I would say that although this essay is long, still I see no point that I could have left out, while I do see many, very many more, that might have been added.

The committee to whom was referred the following essay would report that they have examined it and find that there is no competition. As it is a worthy and exhaustive paper we recommend that it be awarded first premium, and that the writer be requested to re-write and condense it as much as can be done without detracting from its value before it goes into the hands of the printer.

J. S. HARRIS,
Chairman of Committee.

GRAPE GROWING IN MINNESOTA.

By Archie N. Wilcox, Hastings.

THE GRAPE.

Species: *Vitis labrusca*, v. *Aestivalis*, v. *riparia*, v. *vinifera*.

Of the sixteen American and numerous foreign species I have named, but four are worthy of attention here. From these and their various hybrids we must secure the varieties we cultivate. It is useless and I will not attempt to give a detailed history of the grape except to touch upon the different varieties under another head for there is probably no fruit grown of so much value to mankind or so widespread in its commercial or horticultural value. Dating its growth from the earliest antiquity we may safely assume that all our numerous species are derived from the garden of that ancient pomologist, Noah, who planted a vineyard with the lamentable results recorded in Holy Writ.

The most essential elements of success with grape growing in Minnesota lie in the capabilities of the grower himself. Being

obliged to contend with an unfavorable climate and a great variety of soil, he should call to his aid all the advantages which science and the experience of others can give. Plants are living things. He should know something of the structure, methods of growth, their constituents, so as to select their food. He should know something of their relationship to the climate and soil in which they received their birth and development, that he may still preserve their vigor and productiveness. He must know the structure and formation of their productive organs so as to make the most desirable crosses and hybrids and secure the most perfect fertility and development of fruit.

Munson says: "When we consider that here, in the United States alone, there are some fifteen different species of grapes with different adaptabilities and properties with innumerable varieties of earth, that all the species are polygamous and are capable of intermingling, thus making hybrids, and that we must at least use several of these species conjointly to secure greater excellency in quality, and make rapid progress, it is at once apparent how important is a knowledge of grape botany at least to the successful vinegrower and still more to the originator."

But more than all else he must be a clear sighted practical specialist in horticulture and love for its own sake the labor in which he is engaged; with these requirements his success is assured, for most all fruit, grain and vegetables reach their highest perfection near the northern limit of their growth, and this limit is far north of the latitude of Central Minnesota as the abundance of its wild species (*vitis riparia*) on our river bottoms even in Manitoba will testify.

Prof. Budd says there are no wild grapes in Russia north of the shores of the Black sea; yet he has seen raisins from the east for sale at the Russian fairs as good as any from Spain.

Mr. Harris says, "good grapes can be successfully grown in many portions of Minnesota by all who select a suitable location and soil, plant the right varieties and give suitable attention to the preparation of the soil, planting and management."

LOCATION.

In selecting a location for a vineyard bear in mind the fact that once well established it will remain productive for a life time; choose high ground on the shores of a lake or river, if possible with a moderate slope to the south or southeast, where air and drainage will assist to protect against the late frosts of spring

and early frost of fall; if sheltered by nature or a belt of evergreens so much the better.

The best vineyards in Michigan are on a ridge of land about one mile wide and one hundred and fifty feet above the water, surrounded on three sides, east, north and west by the St. Joseph river and Lake Michigan.

SOIL.

For soil a deep, warm, sandy loam which will give the earliest start in spring and make a moderate growth of well ripened sound wood is better than a richer muck or colder clay in this climate for we need all the warmth we can secure in our short summers to develop the fruit and bring the growing vine to perfect maturity.

A stiff clay with proper exposure is better than muck, while the limestone along the Mississippi below St. Paul is quite desirable.

To prepare for planting, plow deep and fine, for the long, slender roots will penetrate far and near, and draw nourishment from every available atom of soil within reach. If the soil is poor and you desire to fertilize it, employ ground bone or wood ashes for that purpose; stable manure will promote a rank growth of wood and late unripe fruit to be killed by the first frosts of autumn, to the great injury of both root and vine.

PLANTS, PLANTING AND CULTIVATION.

A cheap way to secure the best vines for planting, with the advantage of knowing what you have got, is to grow them from cuttings; this may be done in a small way by making cuttings of two or three buds from mature new wood; when you trim in the fall pack in moist sand or moss in the cellar over winter, and in spring secure a box; requisite size two feet high; fill two-thirds full of rich dirt, and set the cuttings with the top bud just above the surface, pressing firmly about them. Nail a thin piece of cotton cloth over the top and place it in a sunny spot near the kitchen door, where you will not forget to sprinkle with warm, soft water every evening. In a few weeks the box will be full of growing vines ready to transplant to a plant bed where you can have them handy when you need, at one, two or three years old. Use the best first; a strong one year old plant is better than a weak one at three years. To buy vines will cost from

two dollars per hundred for Concords to twenty for some of the finer varieties. For plants, use good, strong two year old vines grown from cuttings with two rows of well developed fibrous roots and sound, mature wood, cut back to two or three eyes; or, with varieties like the Delaware, which root very poorly from cuttings, one year old layers are best.

Set the vines early in the spring, and mark off the rows in a straight line not less than 8 nor more than 12 feet apart, and set 8 feet apart in the rows; 8x10 will give 528 vines per acre, which is enough when we stop to consider that each vine will extend its roots 20 feet or more in every direction. Make the holes large enough in setting to spread the roots out in a natural manner without crowding each other, and set the plants in a slanting position lengthwise of the row so the lower eye will be at the surface of the ground, with one or two eyes above; fill the hole with good soil, keeping the roots well apart, pressing the dirt firmly about them, and if the weather is dry mulch lightly over them to retain the moisture; this will insure a vigorous, healthy growth that will well pay for a little extra care and resetting.

During the first season grow one strong cane from the plant with no pinching or pruning whatever in the summer, except to remove such extra sprouts as may start around the vine at the surface of the ground, and all fruit stems which may form. When the season's growth is past and the leaves have fallen, trim away the entire growth above the second well developed bud on the new growth which is usually about one foot from the base where the cane started. Just before the ground freezes bend in the direction which the vine naturally leans and cover entire with three or four inches of earth, for winter protection. A crop of beans may be grown the first and second years without injury, and sometimes when cut worms are thick, with positive benefit to the vines. Corn or potatoes are better than weeds.

The first operation of the second year is to remove the covering and lift the vines, when all danger of spring frost is past, handle with care, without injury to the tender buds, and tie to stakes with bagging twine. Stakes may be of any cheap wood that will last two years, and five or six feet high. Plow at once with one horse three or four inches deep as near the row as possible to cut the surface roots, throwing the dirt away from the vines afterwards; cultivate clean. This season allow two canes to grow, one of which may be stopped at three and the other at six feet from

the base by pinching the end bud. Check all laterals in the same way after one leaf has formed until the first of August, then let them alone until the wood has ripened, and the leaves have fallen. In November the fall pruning should be done by cutting all laterals and shortening the stronger cane to about four feet, and the reserve cane to two buds. Two or three bunches of fruit may be ripened this year. Always lay down and cover with earth as previously described for winter protection.

During the third season follow the same directions as previously given for taking up, tying to stakes, plowing, clean cultivation, and covering. In pruning carry the leaders forward to about double their previous length; remove all feeble or secondary sprouts as soon as they start and pinch laterals freely but never cut away the foliage or full grown leaves; much injury is often done in this way and it should not be tolerated; pinching the end bud is the true way for summer pruning. Yet no arbitrary rule can be given, for no two vines and no two varieties are alike in growth and needed requirements, so the good judgment of the grower with some general suggestions will be the best guide from this time on. One general rule should apply; when the trellis is covered with vines the fall trimming should leave nothing but fruit buds, and these well distributed along the vines, and only in such quantities as the age and vigor of the root will bear; for the form of trellis to be covered, the ideal vine to be grown, and the variety of grape under cultivation, and its liability to disease, all have an important influence on the treatment required. Always have an ideal vineyard in mind and keep the vines as perfect as possible; this may be done by permitting the strong and vigorous vines to ripen a full crop of fruit, while the vigor of the weaker ones is increased to thinning to a few perfect bunches. Never permit the vine to overbear; it will impair its vitality, retard its growth and damage the succeeding crop, and the grower should be prudent in limiting its productive capacity. The formation of seed is the most exhaustive function of plant life, so a few large, compact, well-formed bunches, weighing ten or twenty pounds, are much less injurious to the vine than the same amount in small, inferior fruit.

During the summer and fall of the third year or in early spring of the fourth as most convenient, the holes may be dug, posts set and trellises built, and here we must decide definitely what form will best suit our wants, but for me I would use none other than the flat horizontal trellis, four feet wide and five feet above the

ground with three No. 9 galvanized wires, for I know this form is superseding all others among the most intelligent grape growers of Michigan.

To make this trellis, use pieces of 2x4 four feet long nailed on top of strong posts in the form of a letter T; set these twenty-four feet apart and of a uniform height; upon these stretch three wires, one in the centre and one at the end of each arm; this may be done with long wires permanently, or as some prefer by cutting the wires one foot longer than the distance between posts and twisting a loop in each end and fastening to each post with small staples so they can lay down each length separately with the vines if desirable.

Train the vines to the centre wire and the laterals will reach out over the sides like an arbor, while the fruit will hang at a desirable height overhead, protected by the leaves and in the best possible position to receive any attention it requires.

The additional height from the ground is a great advantage in locations subject to mildew and rot, while the artistic beauty of a vineyard so arranged can not be surpassed.

VARIETIES.

There is no operation in grape growing on which the success or failure of the vineyard more certainly depends than selecting suitable varieties for planting. More than half of the vines in cultivation about Hastings are worthless and it is safe to say nine out of ten of the kinds recommended in the catalogues of eastern nurserymen are of no value here.

The ideal grape for this state will yet be produced; meanwhile we should plant the Concord or Worden for the main crop, the latter being a little the earliest and best. Moore's Early and Delaware are both losing ground in other places but do well here; while the Brighton and Niagara are both gaining in popular favor.

I would plant in the order named: Worden, Concord and Moore's Early for black; Brighton, Lindley and Delaware for red, and Niagara, Lady and Martha for white, with as many of the new highly praised varieties as I could afford to spend my time on, and money with. The Lindley, like others of Rogers hybrids, should be planted next to other perfect flowering varieties to insure its productiveness. Clinton and Janesville are better than none for a farmer in the extreme north when all others would fail.

PICKING AND PACKING.

In picking use the so-called climax ten pound basket with flat covers; these will hold eight pounds of fruit and can be bought for about five cents each. Wait until the dew is off in the morning, and gather only the ripest bunches of fruit. Handle with care and don't disturb the bloom; if you do it will injure the looks of the fruit. Place directly in the basket and when nearly full carry to the packing table, where they will be finished out and covered.

If danger of frost occurs before the crop is fully ripened, gather at once and use the green ones for jelly, which they will make of the finest quality, while those which are nearly ripe may be further developed by spreading in a light warm room with a frequent sprinkling of lukewarm water. These may be made of passable quality, but in marketing sell them for just what they are and do not mark them as "Best Minnetonkas." Pack nothing in light-weight baskets, but guard with jealous care the reputation for high flavor and superior quality attained by Minnesota grapes.

Having but two years' practical experience in grape growing I have drawn freely from such authorities as Munson, Budd, Rogers and Parker, also from original notes of my father and the writings of Harris, Pearse, Latham, and Porter, of your Society, to all of whom I would gratefully acknowledge my indebtedness.

Mr. Stedman, from the committee on prize essays on strawberries and raspberries, reported that of the two essays handed in they had selected the one prepared by Mr. Lyons as entitled to the award.

STRAWBERRY AND RASPBERRY GROWING IN MINNESOTA.

By John Lyons, Minneapolis.

In looking over the program, I see the Society offers special prizes for essays from young men under twenty-five years, and as I am under that age, I propose to tell what I know about growing and marketing small fruits.

It is a very difficult matter to prepare an essay of this kind for

a Society that covers so large a territory as the State of Minnesota, with its great diversity of soil and climate. I shall be understood as referring only to the locality in which I live.

STRAWBERRIES.

The fruit and vegetable grower like the producer of nearly all other farm crops has done but a part of the needed labor to prepare the products of his industry for the use of mankind. Though a larger proportion of fruit can be converted directly to the use of man without preparation than that of any other product of his labor, they are also the most perishable. The grower has to be constantly on the alert to get them to market as soon as ripe and in the best possible shape. Taking it for granted that all present are tillers of the soil and depending upon the production of your gardens or farms for your support, the question arises how shall we make our farms yield a profit on our investments and a reward for our labor? That which affords the greatest profit affords the greatest pleasure; farming or gardening if not profitable is not pleasant. At least that is the view taken by most young people, who do not like to meet with failures, or disappointments such as sometimes happen to gardeners and farmers through drought, insect depredations and prices below the cost of production. Market gardening and growing small fruits for the Minneapolis and St. Paul markets is the only branch of the business that I am somewhat posted on. I will say here that I know more about marketing than I do about growing the fruit. It has been my business for the last five years to market all our produce.

The strawberry is the first fruit to ripen in this locality. I shall confine myself in this paper to my practical experience in cultivating and handling the strawberry. It is said that any land that will raise good corn or potatoes will do; so it will, but it is better to help it a little.

Select a piece of land sloping to the south or east, manure it evenly with good stable manure; plow deep and plant to potatoes; give good cultivation, letting no weeds go to seed. When the potatoes are harvested plow deep as you can, and if followed by a subsoil plow it would be all the better. As soon as the land will work in the spring spread on ashes or well rotted manure; plow about six inches deep; pulverize well, set the plants in rows from three and one half to four feet apart and from fifteen to twenty inches in the rows. When everything is ready we dig a

lot of one year old plants putting them in tight boxes; cover with a wet sack provided for the purpose; then they are taken to a cellar or some outhouse where they are trimmed, roots straightened, wetted and again placed in shallow boxes, and covered as before, when they are taken to the planters. Four men work to a better advantage than any other number. One man with a spade makes holes for the other three, each being provided with a tin pan, holding about fifty plants, and each straddling the row holding the plant in the left hand on one side of the hole as near level as possible; with the right hand draw back the fresh earth which was thrown out and press firmly about the plant. By this method planting can be done with good success even when the weather is dry and warm.

My idea of the best system of renewing is, to set a new plantation every spring, and let each one bear two crops of fruit. This is the best system we have ever tried in our locality. Some varieties, such as Countess, Charles Downing, Manchester and Downer's Prolific invariably yield their largest crop the second year, while other varieties, like the Wilson, may do their best the first season and would not be profitable to keep for a second crop. After a little experience the grower will soon learn which is best. By this means, after the first year, we have a bed in full bearing, one in partial bearing, and a new one coming on each season; considerable land is required, it is true, and much work, but the results are more profitable and almost a certainty. My experience and observations are that the best method for field culture, is the matted row system. The cultivation should be thorough, never letting the ground get hard or weedy during the growing season. Lay the first runners along the row and let them take root; cut off the very late runners, as there will be plenty of bearing plants without them, and the ground should not be more than half covered with plants. About the first of November, or when the ground is frozen hard enough to hold up a wagon, mulch with slough grass, straw or corn stalks, or any coarse material free from foul seeds. The object of mulching is to protect the plants from thawing and freezing during the warm spells in winter and early spring. Be careful not to get it too deep—just enough to hide the plants. If the land is sandy, rake the mulch between the rows in the spring and leave it; if on clay land, take it off and cultivate with small tooth cultivator a number of times. When the fruit begins to set put the mulch back; it keeps all the weeds down and the fruit clean.

When fruiting is over take off the mulch and cultivate same as the season before.

For profitable and successful cultivation of the strawberry there are several things necessary which the fruit grower must remember.

The right kind of soil, proper preparation, strong young plants, clean and thorough cultivation, winter protection, mulched in the rows in summer, careful picking and handling for market. These conditions carefully complied with, it is as easy to grow strawberries as corn or potatoes. They will grow just as well for one as another with similar treatment.

What varieties to plant is a question often asked but hard to answer satisfactorily. Location, soil and season differ so much that but few general rules can be given that will hold good under all the varied circumstances. For the last few years Crescent, fertilized by Countess, has given the best results and largest returns to the grower in our locality. Nine-tenths of the strawberries on the Minneapolis market are Countess and Crescent. The latter is the best berry for general planting of which I have any knowledge. There are several good, productive and hardy pistilate varieties suitable for this climate.

I think all fruit growers will agree with me that the berry most needed at present is a hermaphrodite to fertilize them; it should be as productive and hardy as the Crescent, firm as the Wilson; size and color of Wilson would do very well. With a berry of that description we could get along very well until the perfect berry is introduced.

Having tested all the new varieties that appeared in the last few years May King, Jessie and Bubach are the only varieties that proved valuable on our grounds this last season.

A new strawberry possesses great attraction; we all desire to know how large and productive it will prove to be. It will draw a larger crowd of admiring friends around the market stand than any other fruit ever raised.

There are a great many farmers in the berry business all over the country who ought to go out of it simply because they will not do the business right; they produce quantity at the expense of quality. These men are not making any money in the business and there are many of them making much less from their farm crop because of the neglect that comes from their berry culture. I think these large planters by having so many small soft berries badly handled have glutted the markets and almost

ruined the business. I have seen this class of goods a drug in the market at from two to three cents per quart, but good berries sold quick at from eight to ten cents per quart. Prime fruit in full measure, well and carefully handled, kept perfectly clean, in new boxes and crates and marketed promptly pays a fair profit. There is not too much good fruit grown of any kind; there is not enough of such to supply the constant demand.

To succeed in horticulture as in anything else we must be on time, use judgment, industry and economy. It is not so hard a matter to raise fruit or vegetables as to prepare it for the market. We must bear in mind the fact that our goods must be exposed for sale in competition with those of other producers, and that clean, bright fruit or vegetables will in every case attract the eye of the buyer before that of your less careful neighbor. There is no part of fruit raising pays so well for the labor expended as that of putting it in shape for market. Don't be afraid of spending money for neat packages as it adds more to the fruit than it costs. Early planting cannot be too rigidly adhered to by reason of the frequency of droughts later in the spring, just at the critical time when the newly set plant has yet but a feeble hold in the soil. We have more than twenty varieties under cultivation at present for home use and market. I would select six varieties and raise them alone. Not because they are just what we want, but because they are good and I will hold onto them until something better is found. I would select Countess, Crescent, Windsor Chief, May King, Jessie and Bubach. These are all soft berries but answer very well for the home market.

When I started to write this essay I had but the one object in view, namely to show the profits to be derived from the business. The pleasures of horticulture I will leave with someone older than myself to write about.

I would not wish to discourage anyone from engaging in this interesting occupation, but I ask the question how many of us are making the growing of strawberries a success? What is meant by success is that the acre of strawberries has paid for planting, cultivating, picking, marketing and interest on the money invested, with a fair per cent left for net profit. As to profits of the business we have the advantage over many other sections of the country, by having two large cities only a few miles distant, furnishing a home market for almost all our products, delivering with our own teams and selling either directly

to consumers or to the retail dealers, thus avoiding all cost of transportation and commissions that our brethern of the south have to pay when shipping to our market. But a small portion of our fruit is shipped west or north; it is too soft. No attention is paid to the growing of firmer and better fruit that could be shipped to a distant market. The bulk of our crop is sold and consumed within ten miles of where it is picked, yet with these advantages none of us are getting rich out of the business; some are only making a living, while others are losing money and becoming discouraged with the low prices that have ruled the past few years. In reading the papers I notice a great deal is said about the man who grows from 5,000 to 10,000 quarts of strawberries and raspberries to the acre and sells them at fifteen and twenty cents per quart while nothing is said about the man that gets from 1,000 to 2,000 quarts per acre and sells them at four or five cents per quart. Less acres, more and better cultivation might remedy some of the evils.

RASPBERRIES.

I do not intend to tell where the first raspberry came from by what name called, nor their quality or value, but give in brief form what I know about raspberry growing and marketing. Raspberries are attracting more attention at the present time than ever before; it is a fruit much admired by many. Though never so popular as the strawberry, we have grown them for a number of years for market, but not to the same extent as at present, their cultivation is quite profitable. No fruit that comes after the strawberry is more sought for than the raspberry and until the last few years was very scarce in our market. The red varieties are getting quite plentiful; the black is not grown in sufficient quantities to supply the demand.

Our land is of rather a sandy nature but by preparing it the same as for strawberries we have good success with the hardy red varieties, namely Philadelphia, Turner and Cuthbert. The preparation of the land is of great importance for on this depends the growth of canes the first year and the crop of fruit the second as well as for years after. The land should be plowed deep, and well pulverized, then marked off in rows three feet by six for the red and three feet by eight for the black. At this distance apart they are easily mulched, which is very essential in this dry climate. Marking is done both ways using a marker similar to

a corn marker, then with a shovel plow run one way. The furrow is made deep enough for planting and the plants placed three feet apart and a little earth drawn around them and firmed to hold them in place; then the furrow is filled from each side with a small plow. The land is thoroughly cultivated both ways during the growing season and the plants topped at two feet high to cause them to throw out laterals; in the following spring these laterals should be cut back to six inches long. The land may be cultivated until the berries begin to form and again after the fruit is picked. The second year pinch the tops off at about three feet high. Cultivation should be the same as the previous season. By planting deep and pinching off the tips the canes grow stronger and are self-supporting, thus doing away with the old practice of tying to stakes and wires which was both laborious and costly. Pinch the canes while young and tender. I can use both hands and get along very fast. The canes are not all ready at the same time; it is necessary to go over the ground twice; if the canes get too large, use a knife; treat suckers between the rows as you would weeds unless you want plants; cut them out when young and tender; sprouts or suckers are great annoyances. In growing red raspberries if taken in time they are easily kept down. Raspberries should be kept in hills; this can be done by cutting away with a sharp hoe all sprouts between the hills and the rows, allowing from three to six canes to the hill. For home market all things considered the Turner has given us the most money; its large size and its bright color makes it sell readily at good prices. Philadelphia is an old variety, hardy, and very prolific; the fruit is soft and dark colored, second quality, but grown in large quantities owing to its great productiveness. The Cuthbert is very popular, selling for better prices than any other on the market. It is not hardy, must have good winter protection or it will kill back to the ground. Gregg and Nemaha have done best; cultivation should be the same as for the reds.

Red raspberries should be picked in pint boxes; twenty-four to the crate makes the handiest and neatest package to ship or handle.

Getting our berries picked is the most difficult part of the whole business to handle. Good hands are scarce and earn good wages in the height of the berry season. We are often obliged to get along with a very poor class of pickers. We use a stand, with a handle, holding four boxes; each picker is given a stand

with four boxes in it. The pickers are put two to a row, one on each side. It is necessary to have a trusty man with them continually; his business is to keep order and see that the work is properly done. When the stand has four full boxes they are brought out to where the packing is done, in the shade of a large canvas, or tent; they get a ticket for the full stand and an empty stand with four boxes to fill again, and so on till the day is over. Each day's picking is sold as early as possible the following day, on the market, mostly to retail dealers.

For winter protection the canes are laid down and the tips covered with earth enough to hold them down until spring. One man holds the hill down while another puts on the earth; this, with our usual amount of snow, is enough for hardy varieties. If time permits, the old canes are cut out in the fall; if not, it is done in the spring, not being very particular as to time, the old canes holding the snow and giving additional winter protection.

The blacks should be planted in the spring quite shallow. The reds may be planted either in the fall or early spring.

If any are inclined to differ with some of my ideas, please remember that they are based much on local experience, and have more local than general application. As to cultivation, my advice is simply this — let it be first class.

Mr. Philips from the committee on prize essays on blackberries and dewberries presented the following:

REPORT OF COMMITTEE.

Your committee on prize essays on blackberries and dewberries would respectfully report that we have examined two essays which have been handed to us. We find them both good and instructive, and showing thought and study, and we award the premium to Frank C. Shepherd, aged sixteen. We find such a similarity that we would respectfully recommend that if the Society in the future offer premiums for prize essays, that instead of paying it all to one person, that it be divided into two or three prizes, so that other essays, as in this case, that are worthy can be suitably rewarded. We heartily approve of the plan to encourage the young to pursue this line; to do something useful to themselves and others which will be pleasant and profitable, and make them better citizens, and add new interest to the cause of horticulture.

A. J. PHILIPS,
L. H. WILCOX, *Committee.*

BLACKBERRIES AND DEWBERRIES IN MINNESOTA.

By Frank C. Shepherd, Hastings.

Both the blackberry and dewberry grow abundantly in their native wild state over nearly all the United States and a portion of Canada, growing best under the partial protection of forest and shade, on a rocky or sandy soil, around old logs or brush heaps. It will thrive from year to year without care, and produce a large amount of the finest berries, surpassing in their flavor and quality all other kinds of our native fruit.

Under cultivation the size of the berry, as well as its productiveness, has been increased, while its high flavor has been partially lost, and it seems to be even more tender than in its wild state.

SOIL AND CULTIVATION.

In selecting a location choose a rich, well drained clay soil which will not be liable to suffer with drought, for the finest fruit ripens late in summer when a dry spell is most likely to occur, and an abundance of moisture at that time is necessary to produce a large crop of large and luscious fruit. Work the ground deep and fine before setting them. Early in spring mark the field in straight rows eight feet apart, and set the plants two feet apart in the row, treading the dirt close about them. Cultivate clean afterwards, unless you wish to grow a crop of strawberries or beans among them, either of which will do no harm.

The blackberries grow on bushes of the previous year's growth, so the treatment of the first year will only consist in keeping down the weeds and making them grow as thrifty as possible. Stop cultivating about August 1st, so the bushes will mature their wood before winter; then late in the fall before the ground freezes give winter protection by removing a shovelful of dirt from one side of the bush, and, bending them in that direction, press carefully near the roots to avoid breaking and fasten them down, with a shovelful of dirt on the tops. This will hold them down until you can cover them completely with dirt, and do not stop until they are out of sight from root to top, and then you need have no fear of their winter-killing. When the buds begin to swell in the spring, remove the covering and

straighten the bushes up in line, pressing the dirt about the roots to keep them so; then plow the field lightly, not more than three or four inches, turning the dirt away from the rows on each side to make them run deeper and help to preserve against drought. This season there will be about half a crop of berries, and should be picked in quart boxes, when they will find a ready sale at a good price. They averaged about fifteen cents a quart here the past summer.

After picking go through the field, pinch the tops of the new bushes at the height you want them to remain and they will throw out fruit bearing laterals very freely, which will give the bushes a desirable, strong, low, stocky form and save the use of wires to keep them in position. The proper height to train the bushes depends on the kind grown and should be about two and a half or three feet for Wilson's and the smaller kinds, and four feet for the stronger growing varieties. At this time remove all old wood of the first year's growth, for it will die anyway, and the sooner it is out of the way the better. Then cut the new wood to three or four of the best canes in a hill. These will give better results than a larger number.

Treat all suckers, which on some kinds will be plenty, the same as weeds and kill them, unless you want them for plants. Do not cultivate in the fall, as it will make a late tender growth to be winter-killed. Plants may be secured from suckers or root cuttings, either of which grow rapidly.

VARIETIES.

All varieties of blackberries in general cultivation are selections from the wild fruit, and it is desirable for the grower to set such kinds as will ripen in succession from early to late. Snyder is the best early variety, a strong grower, hardy and very productive on heavy soil, but fails on sand; berries medium size and fine quality. Stone's Hardy or Taylor will succeed the Snyder; the latter of these is of fine quality but a rather uncertain bearer on some soils. For a late market nothing equals Ancient Briton, a large, late, strong growing variety and very productive; this is probably the best of all for this state. Lawton and Wilson are the great market varieties of the East but have been little planted here. The best dewberries for general cultivation are Lucretia and Windom. These may be treated the same as blackberries except to train to wires to hold the

fruit up from the ground. They ripen one or two weeks before blackberries which makes them desirable. In size they are large and in quality excellent.

PROFITS.

The growers may reasonably expect a yield of 100 or 150 cases per acre of 24 quarts each, which at ten cents a quart will give from $240 to $360 per acre, less about $20 or $30 for cases. It will cost one and a half cents a quart for picking, besides which the cost of cultivation, after a field is well established, will not exceed the cost of growing a field of potatoes.

The committee on prize essays on currants and gooseberries, reported that of the four papers handed in they had selected the one prepared by Mr. Brand, aged seventeen years, and he was entitled to the award.

CURRANTS AND GOOSEBERRIES.

By Norton F. Brand, Faribault.

Order or Family:

Tribe: *Grossularieæ.*

Genus: *Ribes.*

In two Sub-genera: { *Grossularieæ* (Gooseberry). *Ribesia* (Currant).

From the above table we see that not only do the gooseberry and currant class together in our gardens and from a horticultural point of view, but that they are intimately connected botanically as well, belonging as they do to the same genus and being the sole sub-genera of that genus.

We long for something sour in the spring; the system needs it — or acid; just such as the currant affords. No one will be likely to use too many of these, and not one in a thousand will use as many as he should. They make pies, and such pies! When one has had nothing but dried apple pies for ever so long, a good piece of currant pie makes you think that there is much in this world worth living for.

Currants and gooseberries, growing in a wild state on rich moist land supplied with an abundance of leaf mold and decaying wood, suggest to us that they are gross feeders and will well repay deep and thorough cultivation and a liberal supply of fertilizers and manure. As no one will want to buy a new place for the purpose of going into the business, I will say but little about the location, except that which applies to all fruit growers, which is, to be as near a good market as possible; although these fruits are not as perishable as strawberries and raspberries, and a plantation of them lasts much longer without renewal.

As the chief endeavor of man is to make money and to have something good to eat, my object in writing this essay shall be directed to the unfolding of the former idea,— to enable him who plants to make money.

SOIL.

Good, deep, moist loam, on clay subsoil, is the best, as this soil needs less manure and mulching than sandy soils. Most any soil however can be made suitable. Deep plowing and thorough harrowing with a liberal supply of well rotted or rich stable manure or woodland mold will put the ground in condition for planting.

AGE OF BUSHES TO BE PLANTED.

They may be either cuttings or one or two year old bushes. If a large quantity are to be set and money is scarce set long cuttings. If money be plenty set strong two year old bushes, for they will begin to bear the next year after planting. To grow from cuttings, select one year old wood about twelve to fifteen inches long. Cut about the first of October. Cut smooth with a sharp knife. I prefer long cuttings. Those who sell cuttings will say that nine inches is the right length, but we have always had the greatest success with long cuttings having tips. Tie in bunches of fifty keeping the cut ends even. Cover them up in a good sunny place in warm, mellow soil, packing the soil firmly against the cut ends. Tie each variety separate with wire. (String will rot off.) Write the names plainly on each side of a label which should be placed in the middle of the bunch. Cover with six or eight inches of good soil; and before hard freezing weather cover them with a coat of manure so thick that they will not freeze. This is so the cuts will callous and begin to heal

at once. Remove the manure from the cuttings as soon as the frost is well out of the ground in spring. The ground to be set out may be prepared in the fall or as soon as convenient in spring.

Planting is next in order. The right distance to plant currants is four to five feet apart each way, according to the size of bush of a particular variety. This will give opportunity to cultivate both ways. Mark the ground off both ways and plant two cuttings at each intersection of the rows. If both grow, one can be dug up. In planting them be very careful not to break off the little newly formed rootlets nor to expose to the air too long. Select the varieties wanted. Put them in a pail which has a little mud and water in it to keep the roots moist. With a spade make a clear cut down on one side five inches deep, throwing the soil out on the other side. In this hole place two cuttings six inches apart. Set them a little slanting; pressing moist soil firmly around the base, being careful not to break off any rootlets. If the soil is inclined to be dry pour in a dipper of water. Sprinkle in the hole about two tablespoonfuls of wood ashes. Fill the hole with mellow soil,— press firmly with the foot, then a little loose soil on the top and they are set. Finish the piece in this way and there will be little or no loss.

CULTIVATION.

Cultivation should be thorough until July when it may cease, or be continued until August 1st, but not later. Great care should be taken to avoid coming too near the cuttings, for if loosened they may die. It is well to use a five toothed cultivator, cultivating both ways.

PLANTING IN FALL.

Cuttings may also be set in September, but if so planted they should be short — about eight inches long. Set the top of the cutting even with the top of the ground; covering with three or four inches of soil, to be raked off in early spring. If one or two year old bushes are used they may be set in October or September. One in a place is enough; a mound of earth should be pulled up around each bush; mulch with manure and tie the top up with a band of hay, which should be removed in the spring. If the planting is done in the spring, plant early, as currants are one of the first things to start in the spring. Good

cultivation should follow the spring planting as well as fall; run the cultivator through every ten days till July. Should the soil be clay and a heavy rain follow right after cultivation, then another cultivation should be given as soon as the condition of the soil will permit, to keep the soil from baking.

VARIETIES OF CURRANTS.

On soils inclined to be sandy the Red Dutch is the best. On heavy soil Red Dutch, Stewart, White Grape, Long Bunch Holland and Black Naples. On heavy soil the Long Bunch Holland lives the longest, makes the largest bush and bears the most fruit of any variety I have ever seen. I have known more than ten bushels to be produced in one year on a row of Long Bunch Holland only fifty feet long. This row was on a northern slope —nearly level—rich black timber soil, and had been heavily mulched in the antumn previous with begasse from a sorghum mill. This variety retains its foliage all through our hot dry summers and frequently holds its fruits till September. It is very valuable on that account. It needs more room than any other variety and they should be set five feet in the row by six feet between rows.

VARIETIES OF GOOSEBERRIES.

So far as our observation and experience has extended the Houghton is the only profitable variety. It may be considered the standard. There have been some instances where the English White Smith has produced remarkable crops for a single season. We have known eight quarts to be gathered from a single bush, but they are not as reliable as the Houghton.

Gooseberries may be grown from cuttings like currants but it is better to take layers—strong, one year olds—to set for fruiting. Set and cultivate the same as currants. The third year they begin to bear well. After they have borne two crops mow the tops off in the autumn or early spring, in this way enabling them to bear a new top and have a season of rest. If they don't get this one year of rest they will take two or three without asking permission. They must have a new top and plenty of stable manure and wood ashes in order to bear much fruit; but with liberal care judiciously bestowed they may be made profitable without these. Gooseberries need mulching as soon as the fruit is gathered to keep the ground cool and moist. In early

spring work the mulching in and cultivate well, keeping the ground clean till the fruit is gathered. Children do not like to pick gooseberries as well as they do strawberries. They say they have "prickles" on. They are right, but they can generally be hired to pick them for one and one-half or two cents per quart. How can this fruit be used to the best advantage? Sell them for from ten to fifteen cents per quart. They are good stewed green for sauce; made into pie; good enough for a "Daniel," provided the sugar bucket has been patronized. They are good canned for winter use and are excellent appetizers along toward spring. They also make as good wine as currants. Preserved they satisfy most appetites. They are more profitable to grow than corn. The farmer gets 25 cents for a bushel of corn while upon the same ground he can produce 3 bushels of gooseberries, worth, at 10 cents a quart, $9.60, which gives the producer $9.35 more than he could get out of corn. There are also profits in growing currants. The best way to sell them is by weight, 40 pounds to a bushel, picked with stems. For market always pick them stems and all. Where they can not be sold thus, of course the best way is to sell in quart boxes like strawberries.

PRESERVING CURRANTS.

Currants like gooseberries will not bear well on old wood, so it is best to cut out all the old wood after they have borne two or three crops. This had better be done as soon as the leaves are ripe in summer or early autumn. Cut close to the ground leaving only wood not more than three years old, mostly one and two years old. Some trimming can be done every year after once begun, and no old wood allowed at any time to accumulate in the bushes. Thorough, clean cultivation, from early spring till July, followed with a heavy coat of manure in July or August, with ashes in the spring sown broadcast, will produce the best crop.

Gooseberries and currants have their enemies. Worms which defoliate the bushes must be poisoned with white hellebore or London purple. If the worms come on early a solution of one-fourth pound of London purple to fifty gallons of water sprayed over the bushes will be sufficient to destroy them. This must not be applied after the fruit has attained considerable size; but should be immediately after the fruit is picked. Should they be-

come bad harvest the crop as soon as possible, then spray twice per week with poisoned water. If the crop is small and the worms bad, better sacrifice the crop at once and exterminate the enemy. Powdered white hellebore dusted on the bushes when the dew is on is also an excellent and effectual insect destroyer. With good care and watchfulness the enemies will be killed out. I had almost forgot to mention black currants. Cultivate the same as other currants. The fruit is good for suet puddings, wines and cordials, and of great value in sickness. Every garden should have a few.

TO CAN CURRANTS.

Look the fruit over carefully, rejecting all injured berries. Pick from the stems, put into a kettle and let them heat slowly and stew gently for twenty or thirty minutes. Then add an equal weight of sugar. Shake occasionally to mix with fruit. Do not allow it to boil but keep as hot as possible till the sugar is dissolved. Put into cans at once and put the covers on tightly.

TO DRY CURRANTS.

Stem the currants. Take one quart of sugar for one quart of fruit. Put in a porcelain kettle a layer of fruit, then a layer of sugar. Add a very little water. When the sugar is dissolved let them boil about two minutes. Skim them from the syrup and spread on plates to dry in partly cooled oven. Boil the syrup till thickened and pour it on the currants to dry with them. Pack in jars and cover closely.

Another way is to dry in a jar, in the proportion of one pound of currants to one-half pound of sugar. Let it stand over night. Boil gently; skin off all skum; then boil ten to fifteen minutes; skim the fruit out and spread on plates to dry in the sun or by the fire, turning frequently till dry. Then place in the oven in pans, stirring often with the hand till too hot to bear. Pack in jars with sugar or put away in paper sacks or in crocks with cloth tied over the tops. Exclude light and keep in a dry place.

TO MAKE CURRANT JELLY.

Use the liquid spoken of in the first recipe for drying currants; skim it well after the currants are taken out until it becomes thick. Put away in jelly glasses and cover them.

Mr. Smith, from the committee on forestry presented the following verbal report:

REPORT ON FORESTRY.

By C. L. Smith, Minneapolis.

Mr. President:

We have not very much to report. The bill presented to the last legislature was buried with the other bills in the rush of business towards the close of the session. As a committee, during the time since then we have done but little except to investigate and compare notes.

The interest in forestry throughout the state is growing. There is a greater interest this year than there was last, or the year before. More than that, our investigation would lead us to believe that the work of forest tree planting is being carried on more intelligently each year. The demand for information upon the subject increases and the information furnished to planters is more intelligent and easier understood than in the past; and some vexed questions have been settled.

One thing I think I mentioned in my report one year ago is the fact that the craze for new foreign varieties seems to have died out, and planters are generally falling back on the native sorts; the demand for white willow cuttings has been greater during the past year than for the Russian mulberry, a hopeful indication of common sense.

One matter I wish to call particular attention to; I have investigated it carefully, on account of the opposition manifested by some to my statements, made a year ago; that is the law regarding tree claims and the distance apart that trees should be planted. I think it has worked an injury to the forestry interests of the state, from the fact that it has led people into the mistake of planting timber plantations too sparsely; getting their trees too far apart. I have visited very many successful timber plantations and quite as many more that have been failures during the last year, and I wish to say that of over one hundred successful tree plantations that I have visited every one of them were closely planted, and of those that have been perfect failures they were generally scattered plantations.

Some four years ago I investigated the tree claim of President Drake, of the Sioux City railroad, that was planted six years ago. He used perhaps eight or ten different varieties of trees

in planting the claim. The ground was simply prairie Trees have been fairly well cultivated each year, and yet I found cottonwoods, that at the surface were as large as my wrist, only five feet high. The money that he has paid out for pruning those trees would have filled those rows with cottonwoods, standing a foot apart in the row. The expense of trimming those trees standing out by themselves, has been more than the first expense of planting would be. My conclusion is, ordinarily it is a mistake to plant trees on the prairie eight or ten feet apart, whatever variety they are; trees that are closely planted do the best, and there is the greatest success when not over four feet apart. I have been observing the condition of these plantations in prairie counties for the past six years. When trees are finally thinned out they should stand six or eight feet apart. They do better if planted close; the time saved in trimming will more than pay the entire expense of close planting.

Again, I think a great deal of money has been wasted, not as much probably during the last year, or the preceding year as in previous years, in trying foreign varieties of trees. I have heard a great many things about the value of foreign varieties of timber and their habits of growth. I was at Mr. Fuller's place. Some of the foreign cottonwoods had a remarkable growth and were promising trees; but on the whole when I come to gather together the exact facts of the history of plantations, as they are growing throughout the state, I must say that so far as actual timber now growing in our state is concerned, there is nothing in the character of the foreign trees that have been planted to justify us in putting any more money in that direction, or to warrant us in planting them in place of native varieties of trees. The ash, box elder, cottonwood, and maple seem to me far superior to any of the foreign trees we hear so much about.

I have been very suspicious of the catalpa. I must say that my experience during the past two winters and the present winter is such that I can not recommend it for general planting. That, however, is not a foreign tree, but it has lately come to the front more particularly as a timber tree for the Northwest.

Col. Stevens. I want to correct you there. The catalpa is a native of Minnesota. The first tree that I saw was found not far from here and it was larger round than that stove.

Mr. Smith. I said it was not a foreign tree, but I have noticed it was killing back. I got some seed from Northern Illinois and planted here four years ago and I must say that the results were

not flattering in the direction of the catalpa as a timber tree. A gentleman went down with me night before last to look at my trees, many of them two inches through, but they killed back on the average two inches and some of them more than three inches, although they made a growth this year of from four to eight feet.

Col. Stevens. Probably you have seen one that I have in my yard that never was killed back a bud, that blossoms every year. I have scattered large quantities of seed broadcast all over the state and especially in my neighborhood. My neighbor has one he brought from Illinois long ago that is as hardy as the oak.

Mr. Smith. Perhaps I have been a little too suspicious in recommending the catalpa. I have seen the tree referred to; and I must say it had the most magnificent show of flowers I ever saw on any lawn. I also saw trees, four years from seed that blossomed profusely last year. I had one cluster with twenty-eight flowers on it, and the tree only four years from seed; it is somewhat remarkable. But I do feel that the catalpa is a tree we can profitably invest in. We should be careful in regard to the locality from which we get our seed. I find the same thing true in regard to the black walnut.

I visited the place of H. J. Ludlow, of Worthington, a short time ago, who is very successful in growing the black walnut. I examined the trees; they are growing very rapidly and are certainly a success there. He related to me some of his experience with the black walnut and the same experience I referred to. They had not produced as hardy trees as those grown from seed procured in Minnesota. Consequently I have every reason to suppose the tree which Col. Stevens has will produce better seed than those obtained in Illinois and further south for anyone buying catalpa trees. We ought to be careful and know where seed is grown if we went to get hardy trees.

The Russian mulberry was referred to here the other day. I have never been a particular friend of the Russian mulberry and I think less and less of it every year. I spent something like a week in Cottonwood county in December last and I investigated there. And I must say though we got our start in them from that county, I found none there that would be any inducement to me to plant mulberries. Those men there who have the mulberries and who know the most about them are planting more or less cottonwoods for windbreaks, more than of mulberries. I asked one gentleman why he planted out willows for a snowbreak to the west of his tree plantation instead of mulberries and the

reasons he gave were these: First, that it was less trouble to plant and care for; second, that the willow grew much faster than the mulberry; next, that it was much more valuable for fuel, and taking all three of those into consideration, why, I must say that I agree with him in his conclusions and approve of his judgment.

Now, my idea, from all these investigations is that in planting a tree plantation on the prairies the first necessity is a snow-break, or protection of white willows; which I believe is the best or cheapest of anything that we can get. They should be planted especially to the north and west; I would rather put it clear around for a timber plantation, but certainly to the north and west, at least two rows of willows; the rows to be four feet apart, and about a foot in the row. Then leave a space beyond that which should not be planted to timber at least four rods wide, where the snow will gather and not break down the young trees.

Again, in the matter of mixing of timber. I do not believe that we can grow walnuts and evergreens as successfully as single specimens as we can when we mix them with other trees. If I were to start a timber plantation to-day on the prairie I would start with my willows on the outside, cottonwoods, maples, then walnuts, starting at the same time a nursery of small evergreens and then transplanting after the third year and mixing in the evergreens with the outside trees. The best plantations I have seen throughout the northwest were planted in that way.

One word in regard to evergreens. I must say I was surprised last summer in seeing the large quantities of young evergreens that have been planted in Minnesota during the past two years. Although we have urged through the press and from the platform and other places the planting of evergreens, I was surprised to see the large quantities of the evergreens in Minnesota in 1888, and that a much larger percentage of them had lived and grown better than in any previous year. One reason for this is that the people have learned the best way to handle them and are beginning to understand that evergreens must not be exposed to sun and wind if they would have them live. Shippers and growers are more careful in the handling and packing of their trees. There has been considerable improvement in that direction. And I would say that I think there is still further improvement to be made. One thing I want to recommend to nurserymen is, my conclusions last fall that every bundle of trees shipped to the planter ought to be properly packed with moss

around the roots, so it could be thrown into a wagon and carried around for a day or two, instead of packing the bundle without any sort of protection, putting moss and straw in the box. The farmer gets them with naked roots; frequently leaves them in his wagon over night and gives no care or protection before they are planted.

One word more in regard to matters of legislation; then I am through. I have investigated the matter of legislation, looking to the protection of timber plantations already growing in the state and just want to call attention to one thing that impressed me the other day. I came through Faribault county where more premiums are being paid by the state for timber plantations and lines of trees along the highway than in any other county in Minnesota. Now, I approve of that. I believe it is right and proper to encourage the planting of these timber plantations. I approve of the bounty that the state gives for these lines of trees and plantations. But I think it is a mistake for the state to pay bounties for the planting of timber in one county and then allow such reckless destruction of timber in an adjoining county. The farmers of the Northwest need to be protected first. A few days since I passed by a large tract of land too rough to ever be utilized for agricultural purposes. There was a second growth of maple, butternut, ash, elm and poplar growing. Most of the trees were about as large around as that stove pipe. They were a handsome timber plantation. That ought to be protected. I inquired of a man living there why this timber was not protected. He said that the original growth of timber there was very rank, mostly hard maple; a man bought it simply for the timber and cut the timber off. The land wasn't worth anything except for timber. He let it be sold for taxes, and it went back and lay for fourteen years; then by some trick he got a quitclaim from the original owner of the land, paid up a portion only of the taxes or bid it in at tax sale, securing that valuable timber for less than seven dollars per acre, went to cutting and burning again; and will probably let it revert to the state for taxes, as the original purchaser did. This is a condition of affair to be corrected by legislation.

I have talked with some of our legislators, and I believe that while we should encourage the idea of planting by every means, one of the most imperative things to be accomplished is the protection of natural timber plantations already existing, and to have such land as is not fit for agricultural purposes preserved

for timber. I do believe that some law can be framed that will meet the demands of this question; that land unfitted for agricultural purposes, natural for timber, can be put into the hands of the state, to be held there for timber purposes.

Mr. Terry. Mr. President, I have been a tree grower all my life, an amateur tree grower, and I migrated into one of the prairie counties of Southwestern Minnesota. Of course what little knowledge I had before that was of great help to me, but the most I had to learn. I do believe that the planting of trees and growing of trees on these large prairies is but in its infancy, and that the best of us know but very little about it yet. I admire much that has been said on this subject; we have had some good pointers given to us, especially to have the willow planted on the outside and leave a centre space. I always leave a pasture field between my willows and think it is of great advantage.

First of all I want to say, for the sake of the prairie, don't be too quick in discouraging the planting of the mulberry. I have them grown from Minnesota seed. I value it first as a forest tree and next for shelter, for it will turn the wind better than any willow yet grown; one mulberry will turn more than three willows, and that in our country is of great advantage. Have known them to stop a bank of snow fifteen feet high, and they never break down from the weight of snow. In the next place we need the birds. We need them for our orchards; for a thousand different reasons we need them; and there is no tree that will induce the birds quicker than the mulberry. You have to feed your birds, and the mulberry is so prodigious in its yield of fruit that I prefer it to anything but the cherry. You can feed the birds in this way without any expense. It makes a very good fruit to can or to make into pies, and it will produce large quantities. It must not be discouraged. I shall have to fight the Society if they fight the mulberry. (Laughter.) I would not advise the president to plant it in his garden, but for the Western prairie, where something is needed that is extremely hardy, it is just the thing. Out of some two hundred and thirty trees that have passed through the severest winters I have experienced for a number of years, I have the first tree yet to lose.

Mr Smith. You find them killing back more or less, don't you?

Mr. Terry. Just about as much as the hardy catalpa, of which I have hundreds of trees that have blossomed, and which is also a tree I would not discard.

Again, I believe in the willow. It makes a good screen. It makes very good fuel; but I prefer one cord of wood of mulberry to three or four cords of willow. I came here to learn and have not pretended to know much about anything so far; but as to these forestry questions I claim to know something, because I have tested different kinds of trees. We have just heard that trees ought to be mixed. I would emphasize that point. Perhaps the most of you know that as sap rises it does not make wood, but after it goes out into the leaves, receives the rays of the sun, and goes through a certain chemical change, it returns and begins to form wood. If we plant the same kind of trees side by side we get the shade from the one kind of tree. If we go into the woods we find the ash will grow in the shade of the cottonwood, but almost any other kind of tree planted under the cottonwood will not thrive. Plant ash with box elder and it will grow very rapidly, but if planted alone it will require a long time to make a tree of it. It grows well with box elder; am I right?

Mr. Smith. Yes, that is correct; they grow well together.

Mr. Terry. With regard to these premiums for timber plantations I would say it is a good thing. I wish some of you gentlemen could live awhile on these western prairies and see the value of trees. One of your former members, now deceased, did a grand work — Mr. Hodges — in getting the legislature to make liberal appropriations in the interest of forestry years ago. I think there were more trees grown then than under our friend's administration.

Mr. Barrett. I have had some considerable experience while I lived on the open prairie and have paid considerable attention to the subject of forestry. I think we ought to be very cautious about how we lay down rules. I was interested in Mr. Smith's talk; but if I were to make a choice of plans, judging from my own experience in my locality, between leaving a vacant space among the trees to catch the drifting snow year after year or leaving it open, I would prefer the latter policy. In our section of the country we have comparatively little snow.

I have a very fine timber claim ten rods wide by one hundred and sixty rods long; it is considered one of the best in that section of the country. It is open for the snow to pile in. I have reaped many advantages from it. It protected my plants even after they had broken down; they would start up again. It keeps the soil moist in summer and furnishes moisture to plants

contiguous to the tree claim. I succeeded well with my trees, owing to the policy of growing them in that form.

A word in regard to windbreaks. My friend Mr. Terry has exalted the Mulberry to a higher degree than I was willing to accord it, but I am willing to try it a little more thoroughly than I have. I want to recommend the sand cherry. That plant is generally ignored. I grow it on our grounds with fine success. It is a very beautiful plant, the leaves resembling those of the willow. If the suckers are allowed to grow they come up thick and are entirely hardy, at least on my grounds. When in blossom they look like plumes waving in the wind. The fruit is fair to eat without cooking.

Mrs. Campbell. How large is it?

Mr. Barrett. The fruit is a little larger than the black cherry, and when cooked for jellies is delicious. My wife has made some very excellent pies from the fruit of the sand cherry. It is a prolific bearer. It makes a fine windbreak and it pays to raise it. I also am trying to make use of the buffalo berry. It grows native, as I stated yesterday, along the shores of the Minnesota river. I would recommend that also for a windbreak.

Mr. Cutler. I wish to say a word in regard to setting trees close together. In grasshopper times I set some soft maples. When they were about three years old I transplanted part of them and left a good many where they were grown from the seed, where they stood pretty thick. Those left in the rows undisturbed are the nicest trees and are the most symmetrical. Soft maple is apt to split, but those left where originally sown are well formed and are a good deal taller than those that have been transplanted. I believe the best way to have good trees is to sow the seed and afterwards mulch the rows to keep the young trees moist during the summer. I have seen trees set on timber claims that were too far apart and they were generally in poor condition. I refer to some timber claims I have noticed at Hector and Bird Island. Where the trees are set close together there are some nice groves. Cottonwoods may be set some distance apart.

Mr. Harris moved that visiting delegates from adjoining states be made honorary members of the Society for five years. The motion was adopted.

Col. Stevens moved to add to the list of honorary life members of the Society, the following names, to-wit: Messrs. Dartt, Gould, Latham, Brand and Smith. The motion was adopted.

Mr. Harris presented the following list of hardy trees and shrubs for general planting, which was on motion adopted:

LIST OF NATIVE TREES AND SHRUBS.

The following list of trees is suggested as most suitable for the purposes named, on account of hardiness and adaptation:

PARKS.

Sugar maple, elm, burr oak, butternut, hackberry, linden, ash, box elder, white spruce, white pine, Scotch pine, mountain ash, tamarac.

Shrubs: Blue beech, wahoo, choke cherry, buffalo berry, thorn apple, service berry, fine bark, round leaf, cornell, red osier, dogwood, red cedar and catalpa.

LAWNS.

Elm, sugar maple, linden, American larch, white birch, yellow birch, white pine, white spruce, arbor vitæ, Kentucky coffee tree, Rocky mountain pine.

Shrubs: High bush cranberry, choke cherry, sumac, wahoo, hazel, cornell, buffalo berry.

STREETS.

Elm, sugar maple, ash, linden and hackberry.

COUNTRY ROADS.

Elm, sugar maple, ash, black walnut, hackberry, Kentucky coffee tree. For prairie regions add box elder.

SCHOOL GROUNDS.

Elm, sugar maple, ash, linden, white spruce, white pine, box elder.

CEMETERIES.

White pine, white or blue spruce, arbor vitæ, and native weeping willow.

In this connection we desire to call attention to the importance of observing Arbor day, and to the following official proclamation by Hon. Wm. R. Merriam, the governor of this state. —[Secretary.]

ARBOR DAY.

Proclamation Appointing April 26th as the Day of Observance:

Arbor day may be considered as one of the most pleasing festivals of the year, and its observance is now so general throughout the states and territories of the Union that it has become almost national in its character. The day possesses the rare feature of being one of pleasure to those who participate in the work to which it is dedicated, and of being in far greater degree fruitful in blessings to the children, the children's children and the generations to follow. Certainly no labor can better engage the hands of the men, women and children of our state, upon a designated day, than the planting of trees, shrubs and vines to beautify the home acre, and to make the neucleus of groves similar to those that now dot the prairies of our state, and which the years will develop into forests that will charm the eye, enhance the beauty of our landscape and prove beneficial to the commonwealth.

Complying with the custom requiring the chief executive of this state to designate the day, I, William R. Merriam, governor of the State of Minnesota, do hereby name Friday, April 26th, instant, as Arbor day, and do earnestly hope that all citizens of the state, individually or as communities, and through the medium of their churches and societies, shall observe the same in manner as shall seem most fitting, enjoyable, and which shall accomplish the most for the work to which the day is set apart. It is desirable that the day be made as attractive as possible to the school children of the state, and that some features interesting to them may be made part of the exercises. It is also hoped, that so far as practicable, all commercial and industrial operations may be suspended throughout the state on this day.

Given under my hand and the great seal of the state, at the capitol, St. Paul, this third day of April in the year of our Lord one thousand eight hundred and eighty-nine and of the independence of the United States the one hundred and thirteenth.

WILLIAM R. MERRIAM,
Governor.

H. MATTSON,
Secretary of State.

The committee on award of premiums, presented their report, which was, on motion, adopted.

AWARD OF PREMIUMS.

Your committee on award of premiums presents the following:

APPLES.

	Premium.	Amount.
Best collection Minnesota apples, S. Corp, Hammond	First	$5 00
Best collection Minnesota apples, F. G. Gould, Excelsior	Second	3 00
Best display Wealthy, F. G. Gould, Excelsior	First	3 00
Best plate winter apples, F. G. Gould, Excelsior	First	2 00
Best plate winter apples, C. G. Patten, Charles City, Iowa	Second	1 00
Best plate seedlings, Mrs. W. Lee, Faribault (special)		1 00
Best plate seedling hybrid, J. C. Kramer, La Crescent (special)		1 00

GRAPES.

Best display native grapes, F. G. Gould, Excelsior	First	5 00
Best plate, A. W. Latham, Excelsior	First	3 00
Best plate, F. G. Gould, Excelsior	Second	2 00

PLANTS AND FLOWERS.

Display ornamental plants, Mendenhall Greenhouse, Minneapolis	First	5 00
Display roses, Mendenhall Greenhouse	First	2 00
Display geraniums, Mendenhall Greenhouse	First	2 00
Display begonias, Mendenhall Greenhouse	First	2 00
Display carnations, Mendenhall Greenhouse	First	2 00
Best single plant in bloom, Mendenhall Greenhouse	First	2 00

CUT FLOWERS.

Hand bouquet, Mendenhall Greenhouse	First	3 00
Floral design, Mendenhall Greenhouse	First	5 00

VEGETABLES.

	Premium.	Amount.
Best display, J. Allyn, Red Wing	First	$5 00
Best display, H. F. Busse, Minneapolis	Second	3 00
Early potatoes, William Lyons, Minneapolis	First	2 00
Early potatoes, H. F. Busse, Minneapolis	Second	1 00
Winter and spring potatoes, William Lyons, Minneapolis	First	2 00
Winter and spring potatoes, H. F. Busse, Minneapolis	Second	1 00
Onions, H. F. Busse, Minneapolis	First	2 00
Onions, William Lyons, Minneapolis	Second	1 00

Turnips, H. F. Busse, Minneapolis	First	2 00
Turnips, William Lyons, Minneapolis	Second	1 00
Beets, William Lyons, Minneapolis	First	1 00
Beets, H. F. Busse, Minneapolis	Second	50
Parsnips, William Lyons, Minneapolis	First	2 00
Carrots, William Lyons, Minneapolis	First	1 00
Carrots, H. F. Busse, Minneapolis	Second	50
Hubbard squash, William Lyons, Minneapolis	First	1 00
Hubbard squash, H. F. Busse, Minneapolis	Second	50
Winter cabbage, H. F. Busse, Minneapolis	First	1 00
Winter cabbage, William Lyons, Minneapolis	Second	50
Winter lettuce, J. S. Gray, Minneapolis	First	1 00

PANTRY STORES.

Display fruit in glass jars, William Lyons, Minneapolis	First	5 00
Display canned fruits, William Lyons, Minneapolis	First	3 00
Display canned fruits, L. H. Wilcox, Hastings	Second	2 00
Display jellies, William Lyons, Minneapolis	First	2 00
Display jellies, L. H. Wilcox, Hastings	Second	1 00
Display pickles, William Lyons, Minneapolis	First	1 00
Sample comb honey, William Urie, Minneapolis	First	2 00
Sample comb honey, William Danforth, Red Wing	Second	1 00
Sample strained honey, William Danforth, Red Wing	First	1 00
Sample strained honey, L. H. Wilcox, Hastings	Second	50

WORKS OF ART.

Single fruit painting, Mrs. E. B. Webster, La Crescent	First	3 00

Your committee find upon the tables twenty-nine varieties of seedling apples grown by J. S. B. Thompson, of Iowa, that are particularly noticeable for their large size, fine appearance and good condition. They are a valuable lesson for the encouragement of all who contemplate growing fruits from seeds. There is no provision made for them in the premium list. Therefore we recommend that they receive honorable mention in the report of this meeting.

Your committee desire to express their appreciation of the exceedingly fine display of plants and cut flowers made by the Mendenhall greenhouse, which has added much to the attractions of the convention.

J. T. GRIMES,
V. H. CAMPBELL,
O. F. BRAND,
Committee.

QUESTION BOX.

The following questions were read:

"What is the relative result of planting blackcap raspberries in the shade or in open ground?"

Mr. Harris. In open ground the yield is a little better, although they are peculiarly adapted to orchards and where there is a little shade. A small amount of shade is no material injury; some think it is a benefit.

Prof. Ragan. That is our experience in Indiana.

"Was there more blight than usual last year among the bearing Russian apple trees?"

Mr. Brand. I think Mr. Peterson reports more blight than usual among his Russians, especially those in bearing.

"What is the best remedy for the destruction of insects on young cabbage plants?"

Mr. Busse. Insects are most numerous after plants have been transplanted.

Mr. Smith. A kerosene emulsion is the best thing I have seen tried. The same thing may be used on the seed bed.

President Elliot. We use whale oil soap and tobacco. That is a preventive to the little black flea.

Mr. Allyn. In putting out plants in a seed bed I always caution my wife to save all the dishwater. It is the best thing I ever tried.

"Should this Society take some action toward the enactment of stringent laws for the prevention of the adulteration of food?"

Mr. Brand offered the following, which was adopted:

Resolved, That we are in favor of the immediate passage of more stringent laws for the purpose of preventing the sale in this state of adulterated articles of food.

"What was the cause of blight among red raspberries last season?"

Mr. Harris. Too much wet weather.

Mr. Cutler. In some places west of the Big Woods raspberries were badly blighted. It came on about the same time as on wheat. At that time there was wet, heavy weather a short time before the berries began to ripen. The young bushes were affected but not killed. I do not know but putting a heavy mulching between the rows had some bad effect.

"Where in this state have the Hibernal or Autumn Streak

borne sufficient fruit to entitle them to be placed on the same list with Duchess?"

Mr. Sias. I would say Mr. Sidney Corp took the first prize for the best collection at this meeting. He is among the first I knew of to grow the Autumn Streak successfully. He lives some fifteen miles north of Rochester and a mile and a half from Hammond.

Mr. Brand. How old are his trees?

Mr. Sias. They must be ten or twelve years old.

Mr. Philips. Hibernal has been in bearing on Mr. Tuttle's grounds for some ten years and is a very heavy bearer.

Mr. Brand. Does it bear any better than Talman Sweet?

Mr. Philips. Yes, it does now, because the Talman Sweets are dead, mostly.

Mr. Underwood was called upon for a song, and rendered a few stanzas of "Tim Finnegan's Wake," much to the amusement of his auditors.

The meeting then adjourned till two o'clock P. M.

AFTERNOON SESSION.

FRIDAY, JAN. 18, 1889.

The meeting was called to order at two o'clock by President Elliot.

Col. Stevens moved that the committee on seedling fruits be continued for another year. The motion was adopted.

Mr. Sias moved the following persons be named to revise the premium list for the horticultural department at the state fair, to-wit: Wyman Elliot, chairman, J. T. Grimes, J. S. Harris, F. G. Gould, E. Nagel.

The motion was adoptod.

Reports were called for from experimental stations.

CENTRAL EXPERIMENT STATION.

Report of Prof. Edward D. Porter, Supt., St. Anthony Park.

Mr. President and Gentlemen:

I wish to make a few remarks as introductory to the report of our central station. As you are aware it has largely devolved upon me heretofore to look after its general supervision, but during the past year there has been a division of the work, and the horticultural department has been placed under the supervision of Prof. Green, who is prepared to make a written report at this time. Our plan of work has been thoroughly re-organized, but as most of you are no doubt familiar with it, I need not refer to it at length. As you are aware we have been engaged during the past year in putting up our buildings, getting each department under its proper manager and getting them familiarized with the work to be undertaken and carried forward.

We have issued thus far five bulletins, giving the details of organization and the results of experiments conducted at the station. We are now fully equipped for the conducting of the various lines of horticultural experimentation, as well as the work in other departments. We are at your service and shall be most happy to receive suggestions from those interested in experimental work, or from any who can render us valuable assistance. I am very sorry to note the apparent lack of interest manifested on the part of the farmers of Minnesota in this matter. I have received but two suggestions within the past twelve months from farmers; and I don't know but that may be two too many!

Now, gentlemen, this station having been thus so thoroughly organized and equipped, it is to-day the best station in the United States. We have been working with this object in view from the start, and we are so situated now that we don't turn our hands over for any other station anywhere else in the Union. And yet this station will be just what you make it in the future, and what the farmers of Minnesota make it. They can make it a grand success, or they can make it a signal failure. If you are going to set on your nests expecting somebody is going to fill them, it is going to be a failure. But if farmers will put their

shoulders to the work we can make the station invaluable to every department of agriculture.

As an illustration as to the want of help and co-operation, the subject of frosted wheat is one of vital importance to at least one-half the people of Minnesota. The great wheat interests of the state have met with a terrible check by the effects of frost and rust. Thinking it was necessary to get reliable information on this subject I published an article in *Farm, Stock and Home* stating some facts in regard to it, asking farmers to send us samples for analysis and experiment. Now, gentlemen, I waited until the last week in December and I got responses from three men, and out of the great wheat belt of Minnesota I got four samples of frosted wheat. That is a specimen of the interest farmers seem to take in this work. The only way to get the samples was to send Dr. Lugger right up along the different lines of railway where the greatest injury was reported, to let him go right out among the farmers, gather the samples and bring them down to us. Now, that is not the kind of help we are looking for among the agriculturists and horticulturists of Minnesota. Will you not take hold now and help us? As I say, the station will be a success, or a failure, in proportion as it meets with encouragement at your hands.

Mr. Pearse. I want to say that I have just been to the farm and have examined every department, including the new agricultural school; have been through from cellar to garret. I have examined every department of the work. Gentlemen, I will tell you right here that if there was capacity in the building there would be no difficulty in getting three hundred students in the school. I have never seen a more desirable place for a farmer's boy to obtain an education and get such information as properly pertains to his calling. Every department of agriculture is thoroughly treated; mechanical education is also conducted. It is necessary for farmers to understand the handling of tools. I was gratified in finding such perfect system in each department, and to find the boys there so entirely satisfied and pleased with the instruction they are receiving.

Mr. Grimes. I was over the farm last summer and examined the buildings. I was there again to-day, and I was very much pleased with what I saw. We were in the school room and everything seemed to be going on nicely. The superintendent showed us through the different rooms, and everything was in complete order. At the greenhouses we saw the plants, the

samples of frosted wheat that had been placed under test, foreign grains that were being tested, etc. We visited the workshop where we found the boys engaged in making different articles necessary upon a farm. It was evident the school was being conducted in a manner to make the instruction for the farmer's son as complete as possible.

Mr. Reeves said he had supposed on going to the station he would find an institution that was just getting into working order. He had understood the new school building had just been erected, and supposed it was still incomplete. He had been surprised to find everything there in such fine working order, and it was the most complete institution of the kind in the country. Everything in the school room, workshop, greenhouse, etc., was in good working order. At the barn he had been interested in examining the silo and samples of food taken therefrom as well as the foods used in experimental feeding. This "sauer kraut," as one of the professors called it, was fed to the cattle, but it was not as sour as he had supposed. It was preserved in this way and was very palatable to the live stock.

The following report was made by Prof. Green:

CENTRAL EXPERIMENT STATION.

Report of Prof. Samuel B. Green, St. Anthony Park.

Members of the Minnesota Horticultural Society, Ladies and Gentlemen:

I will not take your time to more than suggest some of the lines of work which have been undertaken and have occupied the time of my division of the experiment station the past season. A full and detailed account of the work accomplished during the eight months I have been in charge will be found in the report of the university experiment station for the year about to close.

The season as a whole has been favorable to plant growth here, although so much damage has resulted from early frosts in the northern portions of our state. We have been somewhat troubled with excessive rains but the work generally speaking has been satisfactory. I have labored under the disadvantages

which a new man always experiences, no matter how well qualified he may be for his position, in not being familiar with my surroundings and the people with whom I have come in contact. But right here, and before I go on with my report, I want to thank you for the uniform courtesy and kindness with which I have been received by the officers and members of this Society. I feel that from this enthusiastic and intelligent support that Minnesota horticulture receives at your hands, that it is right to look for a great advance of its interests in the near future, and that it will not be long before many of the problems now exciting your attention will be solved. Please remember that at all times you have my heartiest desire to co-operate with you in advancing the interests of horticulture in this state.

The work of the horticultural division has from necessity been largely preparatory during the past season. My report covers a period of nearly nine months, from the tenth of April, when I took charge of the department, to the end of the calendar year.

I found the department in as good condition as could be expected, when is remembered the disadvantages under which Prof. Porter labored in being obliged to divide his time between so many kinds of and so much labor, and I am indebted to him for laying a foundation from which I was able at once to obtain some conclusions of benefit to the horticultural community.

The horticultural department, it may be said, was created but last spring, for then it was that an allotment of land for its exclusive purpose was made and it has required the whole past season, practically, to arrange for carrying on the future experiment work of the department. I look upon the past season's work as the beginning of experiments which will prove more beneficial as the needs and wishes of the horticulturists of the state become better known and the work of the station more perfect. In some lines the work has not been nearly so complete as I had intended from lack of time or facilities for carrying on the same.

The lines of work proposed for the year and the future will be found in bulletin No. 3, which is included in my complete report.

RUSSIAN FRUITS.

Among the lines of work which should have special mention are our Russian apples and other Russian fruits.

The Russian apples have made an excellent growth and ripened their wood perfectly. The report in bulletin No. 3 gives their hardiness during the winter of 1887–1888, and the results therein stated have been justified by the season's growth. There has been no dying back of the branches after they had partially leaved out as has happened some past seasons, but there has been a strong, firm and healthy growth the season through. The number of trees planted out permanently has been greatly increased by planting trees between the rows in the orchard. It is my intention to use these extra trees between the rows for filling up any vacancies which may occur in the original plantation. Thus the number of Russian apple trees on trial on the station lands is about 1,300, which number includes two hundred and sixty varieties.

The original Russian orchard was planted out in a very exposed position on rich soil four years ago last spring. They have therefore as yet produced no fruit at all, and our observations have necessarily been confined to noting their hardiness and freedom from disease.

I wish it was within my power to give a more decided and conclusive report on the Russian apple tree question, but it is not and I do not believe that the subject would be improved by my drawing inferences from conclusive results obtained in other quarters. There is in fact no short cut through the task of learning all the merits of an apple tree. We must give it a careful trial and abide the results. The trial of an apple tree from one section requires almost as much time in another as the trial of a seedling. Those who like to boom a variety of apple or anything else upon a short trial seldom fully consider or care about the disappointment they may occasion or the real set back they may cause the subject of fruit culture. I believe there is much to hope for from our Russian apples and that many of them will be found adapted to the wants of Minnesota. But until we can have them fruit and grow freely on the station lands I shall not draw final conclusions but shall confine myself to issuing occasinal bulletins upon their hardiness and their freedom from disease. In fact I shall confine myself to "results" from the station work in this as in all other matters.

The following are the most promising varieties in our Russian Orchard:

Green Streaked,	Klenvskoe,	Green Glass,
Pointed Pipka,	Romenskoe,	Voronesh Reinette,
Arcad,	Koursk Anis,	Pear,
Red Pipka,	Aport Orient,	109 Vor,
Keiv Reinette,	Wine Rubets,	Yellow Calville,
Blushed Calville.		

The Russian pear, Bessemianka and Waxen, which stood the winter of 1887, with little, if any, winter killing, have made a most magnificent growth and are evidently fully as hardy as the Russian apples. The growth in 1887 was much of it three feet long, and yet was but very little injured by the past winter, only something like two inches of the new growth being killed back. The foliage was thick and remained bright all the summer. I am in hopes of getting some fruit from them next year as there are some fruit spurs well developed.

I have lately made preparation to plant out a large assortment of Russian pears and also an orchard of Russian cherries and plums the coming season.

RUSSIAN WILLOWS AND POPLARS.

These are mostly of promising value for economical purposes. They have been free from diseases thus far, and are very free growing and hardy. Most of them strike readily from hard and soft wood cuttings. In my report will be found a table showing the growth they made the past season from cuttings.

Populus certinensis is a very rapid, strong, erect grower, and I think will become a favorite for windbreaks. In our nursery it has made a stocky growth of nine feet in two years from the cutting and has been perfectly healthy and hardy. This tree is very highly esteemed in Russia for its wood, and as an ornamental tree.

Salix Laurelifolia is a very handsome willow. It is hardy and a free grower, with leaves which are thick, broad, and of a very rich, dark green color. I consider it one of the most desirable of willows for ornamental planting or for windbreaks. Its bright leaves are very pretty and in striking contrast to the foliage of most trees.

DISTRIBUTION OF TREES, ETC.

Last spring we distributed nearly one hundred and fifty packages of nursery stock, consisting of an assortment of Russian apples, willows and poplars and grape vines. In all amounting to about 5,000 plants. These were distributed over a wide range of territory in this state. So far as heard from the packages have been favorably received and cared for. I anticipate that much will be accomplished by thus sending broadcast over the state so much material likely to be of value.

These packages were only sent to reliable parties who it is believed will care for them properly and will report the results to the station. The reports from these packages must form reliable data, when considered as a whole, on which to base conclusive reports.

I hope ere long to have the station nursery in such a condition that without going into a nursery business of sufficient dimensions to interfere with the business of the regular nurserymen of the state, we may be able to offer for sale, in limited quantities, novelties in the line of trees and fruits of special merit at low prices. We have now on hand quite a collection of grape vines, Russian willows and poplars and apples propagated this season which will be distributed the coming spring.

TESTING OF SEED AND PLANT NOVELTIES.

I consider that an important work may be done and that the horticultural department may serve as a salutary check in trying any novelties in the line of seeds and plants and also in testing the germinating power of seeds.

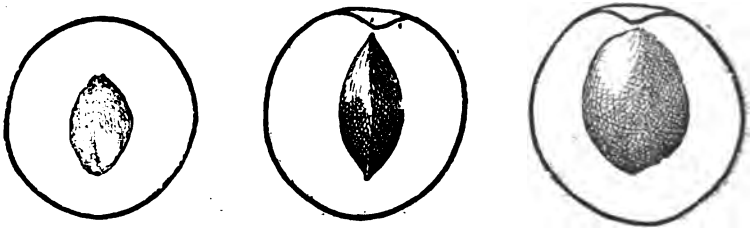
When a seedsman or nurseryman offers in his catalogue seeds or plants which he says possess all the merits possible for given seeds or plants to have and then asks a high and often excessive price for them, he should be made to feel, if he does not, that his reputation is at stake and that he has taken money and must give a fair value for it, or he has deliberately swindled his customer. There is a growing feeling in the agricultural community that the state should exercise some control in the matter and that the importance of the subject demands as much an inspector as does the fertilizer business in the older states, or the dairy business in our own state. A check of this sort, if exercised circumspectly, would be advocated by all honest, reliable seedsmen

as a means of ridding the business of dishonest, unreliable concerns, and of putting extravagant representations at a discount.

NATIVE PLUMS.

This is the representative fruit of the great northwest. Perhaps no other fruit is so perfectly adapted to the conditions of this climate. It varies greatly in its native state, and is susceptible of much improvement under cultivation, and undoubtedly some hybrids between it and some of the larger and finer but more tender plums will give us varieties much surpassing anything we now have in quality, while of sufficient hardiness to withstand our climate.

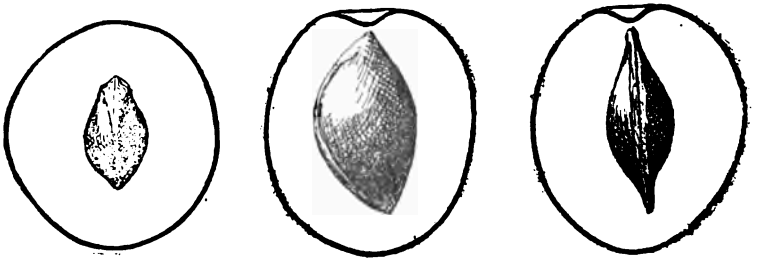
Forest Garden.— First ripe fruit, September 14th. Size 1¼ inch in diameter, nearly globular. Color, orange yellow skin, more than



Figures showing three different sections through the fruit and stone of the Forest Garden Plum. End view. Side view. Edge view. Natural size.

half covered with a red cheek, spotted with brown and yellow. Suture slight or none at all. Cavity deep. Skin acerb. Flesh sweet and pleasant, much marked by the curculio. Stem ¾ to 1 inch long. Tree rather spreading in habit.

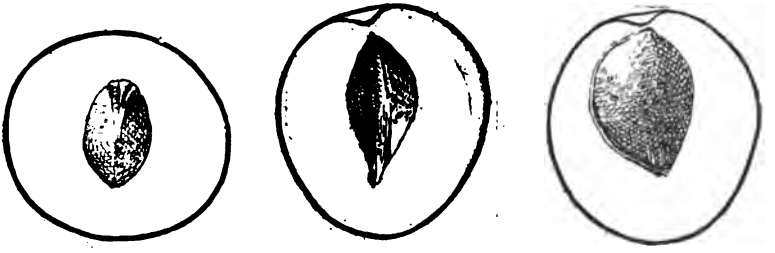
Weaver.— First ripe fruit September 25th. Form oblong ovate. Diameter from apex to base 1½ inches. Short diameter 1¼



Figures showing three different sections through the fruit and stone of the Weaver Plum. End view. Side view. Edge view. Natural size.

inches. Well marked suture from cavity to apex. Cavity moderately deep. Side with suture projects much more than any other. Stem 1 inch long. Color nearly to entirely red. The color deepest in many spots. Shaded red with yellow cheek, the cheek spotted with red. Flesh yellow, separates easily from the stone. Mild in flavor, and often lacking in sprightliness, but a good eating plum and nearly free from the bitter acerb skin so characteristic of our native species. Stone one-sided, projecting mostly on side next to suture. Three-fourths to 1 inch long and from ½ to ⅝ inch wide. Pointed at each end. Its thickest place is at a point a little removed from the centre and towards the stem. Tree spreading. Tree planted in 1886. First crop of fruit.

DeSoto.— First ripe fruit September 30th. Color red, with thin light bloom. Nearly round. One inch in diameter. Stone oblong,



Figures showing three different sections through the fruit and stone of the De Soto Plum. End view. Side view. Edge view. Natural size.

flattish ovate. Suture somewhat indistinct. Cavity deep. Stem 1 inch long. Flesh yellowish. Fair flavor and pleasant. Rather sprightly. Skin a little acerb. Tree rather upright in form. Tree planted in 1886. First crop of fruit.

CURCULIO PROOF PLUMS.

Much has been said and is being said about curculio proof plums, and there are many varieties being offered with this recommendation. It should be clearly understood by all growers that there is no plum that is curculio proof in the sense in which the expression is generally used — *i. e.*, that they are not liable to the attack of the curculio. Plums, so far as our observations go, are nearly equally subjected to the attacks of this insect, and a careful examination of almost any lot of our native plums will reveal its mark on many of them, there often being as many as five on a single specimen. I found it difficult this summer to select

sufficient fruit from a bushel of native plums, which were free from the little crescent mark in the skin, to fill a quart jar.

It is from this crescent-shaped mark which the insect makes in the skin of the plum, when it cuts through to lay its eggs in the fleshy tissue, that it takes the name of "Little Turk."

Our native varieties, from the fact that they are vigorous and grow very rapidly are able to either drown out or to squeeze to death any egg that may be laid in the tissue during its most rapid growth, so that but very few of the eggs come to maturity in this plum, and while they are not curculio proof, yet they have the property of killing the eggs and preventing the destructive results which come when they have full freedom to hatch and mature, as when they are laid in varieties of European origin.

Nevertheless, our native plums are much injured by this curculio, which is the cause of the many little hard blemishes in the skin. Also there are a few eggs of the curculio which grow each year in this plum, and they are those which are laid after the plum has somewhat lessened its growth.

VEGETABLES.

As it was quite impracticable to do much in the way of increasing our experiment work in the small fruit line other than by planting out and preparing for results which it will require more than one season to finish, I decided to go largely into the testing of most of the standard as well as novelties in vegetables. My reason for planting the standard vegetables was that the data thus obtained would serve to some extent as a basis for the comparison of future results obtained from a trial of novelties.

The work has been well and carefully carried out and many of the results are interesting. Some of the reports of varieties are not so complete in giving the marketing qualities as I wished. But I hope to add these features another year.

VINEYARD.

The new vineyard which was planted out in the spring of 1887, has made a vigorous, healthy growth. The only sign of disease in it occurred in August when I noticed the first appearance of downy mildew (*peronospora viticola*) on the leaves. This disease was of short duration and caused but little hindrance to the ripening of the wood. A trellis has been erected in this vineyard this fall to take the place of stakes which have been

used the past two seasons. The vines have been carefully pruned and laid down and are in excellent condition to commence our contemplated work with them in the future; this I intend shall consist in trying different methods of pruning, besides testing the many new varieties which are in it. The growth of vines in the older vineyard has been excellent, but the fruit, which was late in setting, did not ripen well on account of the cold season, and the downy mildew will be referred to in detail in my complete report.

GREENHOUSE.

There has been a new greenhouse erected on the station lands which will probably be sufficient for the work of the station for many years to come, unless it should be considered best to maintain a conservatory or to greatly enlarge the commercial feature of the department. These houses are well situated and conveniently and compactly arranged, and are exceedingly well adapted to the business of the department. A more extended description will be found in my report.

ARBORETUM.

I hope the coming season an appropriation will be made for the purchase of desirable material for an arboretum at the station. We have already some material growing in the nursery, suitable for this purpose but it must be largely increased, in order to have it embrace a fair proportion of the desirable trees, shrubs and herbaceous plants which are adapted to the climate of this state. It is very desirable that the work be commenced at once as many of the trees and shrubs must be obtained of small size and will need nursery treatment before being planted out permanently. Such plantation well and tastefully laid out along permanent drives, with all the plants easily accessible, and each plainly marked with its common and scientific names would prove especially ornamental, and materially aid in the instruction of our pupils, besides being of much interest to visitors. It would also be of much interest in determining the relative value of plants for forestry and ornamental purposes in this state. In the laying out of drives about the farm they should be made of sufficient width to allow of the carrying out of this plan of a border on each side.

EXPERIMENT STATION AT LA CRESCENT.

By J. S. Harris, Superintendent.

Mr. President and Gentlemen of the State Horticultural Society:

Like the most of the parties you have designated as managers of experimental stations, I am not a commercial nurseryman and therefore my opportunities for securing trees and plants for the purpose of testing them are somewhat limited; but my judgment of the merit of varieties I do place on trial would not naturally be warped in their favor through consideration of the amount of money that can be made out of them. One of the prime reasons that has prompted me to advocate the establishment of these stations was that when any variety of fruit had been sufficiently tested in these stations to warrant its general planting and cultivation its merits would be very generally known to the public and it would be practically out of the power of any one individual to get possession of the entire stock and make a fortune out of its sales.

Most of the individuals managing these stations are laboring under serious difficulties and perhaps the greatest is that they are not financially able to devote their whole time and attention to a work the results of which are so doubtful and the money value of which is so uncertain. While I am prepared to test the quality, adaptability and hardiness for my location of every new seedling and unknown variety that comes up I find it very difficult and sometimes expensive to get hold of them.

I have desired to make a specialty of the collecting, testing and improvement of the native plum, and to this end have repeatedly through the *Farm, Stock and Home* requested parties having or knowing of varieties of merit to send me rooted sprouts or scions and as far as possible samples of the fruit, or at least to notify me where they might be found, but have not thus far realized my expectations. As the plum very generally failed to fruit last season in most localities it was an unfavorable year for the work.

Among the varieties I have had under cultivation long enough to get into bearing last year, the Dakota fruited best, probably because it came into blossom two or three days later than most other varieties. I have added to my list of varieties during the year one variety from Blue Earth county, two from Houston

county, one or two from Brown's Valley, and two from Carver county I have received for planting next spring ten varieties from Springfield, Brown county.

None of the Russian varieties of apples I have on trial received any visible injury from the winter of 1887-8. Trees of the Red and Yellow Anis fruited for the first time. The trees were not so large as the Duchess, about a month later in season, and of rather better quality. Among the varieties received from the Iowa State Experimental Station, the Antonovka and Ostrokoff still appear to be the most promising.

Plants of the buffalo berry and sand cherry were received from Bismarck, Dak., and will be given a careful test. We have put in a few buds of Klein's seedling, of Houston county; also seeds of same and buds of the Daisy, a promising seedling originated by H. J. Ludlow, of Nobles county.

We believe that good results will be attained through the working of our experimental stations, and that they will prove valuable auxiliaries to the endowed stations at St. Paul and Owatonna, but we think it would prove a stimulus to more thorough work if a small proportion of the funds provided through the Hatch bill were judiciously expended upon them and they were placed under the oversight of a general superintendent.

EXPERIMENT STATION AT MINNESOTA CITY.

By O. M. Lord, Superintendent.

The season has been favorable for small fruit. The Jessie strawberry fruited for the first time here and answered all expectations, being very fine in growth, quality and quantity.

The Manchester, Crescent and Downer's Prolific also did well. Of numerous other kinds nothing special can be said. No attempts have been made to test different varieties of currants. The common Red Dutch has given good satisfaction.

GRAPES.

Moore's Early and Worden, and a few vines of Concord and Delaware ripened; other kinds were injured by the frost.

RED RASPBERRIES.

Another year's trial has shown the Turner and Cuthbert to be better adapted to this vicinity than any others.

Of the blackcaps the Gregg had a very rank growth of canes, which appeared early in the spring to have been winter killed, and were cut back to two and a half feet without expecting much fruit, but they bore a large crop and very fine quality.

The Gregg has not before last winter been much injured, but the precaution was taken last fall to cover them, a much less difficult work than it was supposed to be.

BLACKBERRIES.

The Ancient Briton yielded best and a good many were picked two weeks after the Snyders were gone. The Snyder bore finely and was a good crop; Stone's Hardy also did well. It has generally been said to ripen between Snyder and Briton, but here it ripened before the Snyder. Between Snyder and Stone's Hardy there is very little difference in yield and quality. In habit of growth the Hardy has a shorter, stouter cane.

DEWBERRIES.

The Lucretia bore some very large, fine fruit; but there were many imperfect berries. The Windom made a good growth of plant but did not fruit.

PLUMS.

Rollingstone and DeSoto bore a little fruit, but no other kinds had any, though all the trees blossomed very full. Several plum trees were received for testing and have made good growth.

APPLE TREES.

No apple trees bore fruit except a few Duchess and Wealthy. Some Russian trees were received from C. G. Patten, of Charles City, Iowa, and some from A. W. Sias, of Rochester, which have made a good growth.

These experiment stations, as at present organized, can not be expected to accomplish a great work, until some method can be devised to provide samples for testing, without personal expense. There is too much uncertainty of results to justify the outlay of money by those who are willing to do the work.

It was understood that a distribution would be made by the state station, as soon as possible, among the stations appointed by the Horticultural Society, but there is probably no requirement of that kind. Or, is a formal application for trees or plants necessary, to obtain them? At the best these stations are struggling along in a limited way compared with the horticultural interests of the state.

REPORT FROM WINONA COUNTY.

By O. M. Lord, Minnesota City.

There is from this vicinity no encouraging report to be made upon apples. The market was bare of all kinds except Duchess and crab apples, and these were grown upon the high lands, away from the river or upon the prairie. The market was however well supplied with these at fifty cents per bushel.

Strawberries, currants, raspberries and blackberries all yielded fairly, and in addition to the local demand, a good business was done in shipping. A large part of the grapes were injured by the early frost, but Moore's Early, Worden and some others ripened and were marketable. Comparatively no plums were produced especially in the valleys or on low grounds. There was, however, a middling crop in the western part of this county.

Increased attention is being given to the small fruits, especially raspberries and blackberries, as they were found to be quite profitable last year.

It was said that the Wisconsin growers, who have usually shipped large quantities in here, found a better market eastward.

REPORT FROM WASHINGTON COUNTY.

By M. C. Bunnell, Newport.

Mr. President and Members of the State Horticultural Society:

I have deferred writing my report until the opening of our annual meeting, consequently have not entered very minutely into details.

As to the progress of growing fruits in the counties of Washington, Ramsey and Dakota, adjacent to St. Paul that I have been over more or less within the past year, I find many that tell the same old story, that there is no use planting standard apples in Minnesota; that it is a failure. Perhaps we might attribute the failure partially to the care and management of trees after they are planted. The careful planter may lose some trees, still if he is judicious in selecting good hardy kinds, and buys them from responsible parties, he is usually amply rewarded for his time and expense. It is true we have had severe winters in the past that have injured both Duchess and Wealthy — more particularly the latter — but I find in certain locations in Washington and Dakota counties, on clay soil the Duchess bore quite bountifully. Peter Gillen, of Woodbury, Washington county, is a man who takes an interest in raising apples, and I hear he raised one hundred bushels of Duchess. His location is on a piece of ground perhaps a little rolling; clay soil. He plants carefully and takes care of his trees after he plants them. His neighbors seem to think he has the favorite spot for raising apples in Woodbury. Whenever any of his trees die he replaces them with young trees, which of course is the right way to do, to make success of orchard growing. He is now trying some of the Russians.

The winter four years ago killed a good many Wealthies; and the young trees planted since have not come into bearing much, yet I think the time is not far distant in Minnesota when Wealthies will be picked from the trees in abundance and stored away in our cellars. I notice a good many are still anxious to try it again (replant).

Minnesota, being far from any large bodies of water, has a dry temperature through the winter (as a rule), consequently is not so well adapted for apple growing as in states bordering on large bodies of water, where there is more moisture; but I am satisfied in my own mind that if the purchaser informs himself as to the best varieties for Minnesota and is not led away by some oily-tongued agent who has a particular variety that he makes a hobby of because he can get a good price for it while he knows nothing about it; I say if he will buy from good authorized agents that represent good companies, plant his trees in a good location where he can get a northern slope with clay soil if possible, digs good sized holes, plants carefully and mulches well, keeps stock away, for no one

need expect to gather fruit in a cow-pasture, I think he will meet with success; so much so that he will be encouraged to replant whenever any of his trees die and so have fruit coming on every year.

My motto is to give the standard apple a slow steady growth that the wood may ripen up well in the fall before our hard winters set in. I think it a good plan to wash the bodies of trees with strong soap suds or weak lye. Some use whitewash. The Whitney is coming into favor more with the farmers as they plant it and see how handsome a grower it is and how well it stands Minnesota winters. I take notice, however bad the Transcendent has blighted in years gone by, that the market gardeners will order them in preference to any other crab for general use. The demand seems to be greater for them in the St. Paul market. The prices per bushel for the season of 1888 was seventy-five cents to a dollar and a quarter. Hyslops sell quite well for sweet pickles. Early Strawberry and Orange should not be left out when one is making a selection for an orchard.

I recommend those planting apples to try some of the new Russian varieties. What we need is a late keeper.

For a variety of plums I would plant De Soto, Weaver and Forest Garden. I hear that Bassett's American plum is recommended, but from practical knowledge can not say as to its merits. Plant plums in groups, as they bear much better.

The season for grapes was unfavorable, many varieties not ripening. I find that the fruit growers in Minnesota have considerable faith in grape culture. For planting I would select Concord, Delaware, Brighton, Rogers No. 4, 15 and 39.

Currants were a very fair crop, and sold from one dollar and fifty cents to two dollars and fifty cents per bushel.

Strawberries were an average crop, prices ranging from five to fifteen cents per quart.

Raspberry culture pays pretty well, planting for the blackcaps Mammoth Cluster and Gregg; reds, Turner, Cuthbert and Brandywine. Prices ranged from twelve to twenty-five cents per quart. More attention is being paid to the raising of blackberries, Ancient Britons and Stone's Hardy being the leading varieties.

I see no reason why anyone that owns a home in Minnesota can not supply his family table every year with some of the hardy fruits, and make it inviting to all lovers of horticulture.

REPORT FROM CHIPPEWA COUNTY.

By O. E. Saunders, Granite Falls.

The past season has been upon the whole quite favorable to fruit culture. Wild fruits were not plentiful, but cultivated ones did exceedingly well, in fact all the small fruits being a grand success.

Our town is well supplied with strawberries, and it appears that consumption increases with the supply. Some attention is given to raspberry culture. The red varieties succeed finely, but in some localities the blackcaps blight so badly as to make the crop a complete failure. I have not been able to raise a crop of these yet.

Grapes are proving a success, although the vines have been in bearing only a few years. The vines received from Prof. Porter in spring of 1887 are doing splendidly. Mr. Regester took some of those sent me and placed them in a very favorable location, and this season they bore quite a crop of fruit. Mine have not yet fruited, but are making very satisfactory growth. Have made a large number of cuttings from them this fall.

Blight has been particularly severe on apple trees for two years past. Nearly all of mine have succumbed. So poor success has been attained in this line, that comparatively little effort is being made to succeed at present.

Of one thing we are assured, that it is a very easy matter to raise the small fruits, and no farmer need fail of having his table well supplied with these delicacies. My health has been so poor for a few years that I have done very little in horticulture, but with return of health I hope to increase my labors in this direction.

My best wishes for the success of the State Society.

REPORT FROM NICOLLET COUNTY.

By C. F. Brown, St. Peter.

S. D. Hillman, Secretary, etc.,

DEAR SIR: The report on fruit for 1888 for this locality is a brief one, as the crop, generally speaking, was decidedly so. Strawberries were a fair crop and of good quality. Raspberries were not satisfactory; probably the severe winter injured the vines. Currants were not in the market in any quantities, as very few were raised. Apples, the least number offered in the market for the past ten years; even the Transcendents did not do well. Plum trees blossomed very full but produced no fruit, either from the late spring frosts, or a cold rain which occurred while in full bloom. Grapes were overtaken by the early fall frosts, and the fruit in the market was unripe; the crop was a large one and would have been nice but for the frost. Bananas made a good growth but produced no fruit; they are not quite hardy enough to stand the winters without protection; therefore, are placed in the cellar in the winter.

REPORT FROM OLMSTED COUNTY.

By William Somerville, Viola.

Mr. President and Gentlemen of the State Horticultural Society:

In consequence of sickness in my family I can not be with you at this session of your Society, and for the same reason I was unable to meet with our horticultural friends at Rochester to give my experience in raising apples in Minnesota.

I believe I have paid out as much money for trees and have raised as many apples as any farmer in this state. As I came from a fruit-growing state I resolved when I came here to raise at least apples (I hold them to be the king of fruit) or to leave the state. So I set out twenty-five trees, purchased of A. W. Sias, who then represented a Rochester (N. Y.) nursery. They were the Talman Sweeting, Golden Russet, Fameuse and a number of other varieties. They bore fruit for fifteen or sixteen years.

In 1862 I gave Mr. Sias another order for two hundred trees including fifty Duchess. They were yearlings and small at that. Those Duchess are all living yet and are large, fine trees, bearing annually from two to six barrels each.

Since 1865 there has not been a year but I have raised more or less apples, and have planted out some trees almost every year since. For a number of years I have raised from one to five hundred bushels, but the last crop was the largest I have ever raised, as I had quite a number of new Russian varieties just coming into bearing.

As nearly all my old varieties had been killed off with hard winters previous to 1876, Mr. Sias and myself hoping to get something hardier, got "seedlings on the brain." We hunted up the best in the country and got scions from them and raised little trees and thought we had struck a bonanza. We used no scions that the parent tree had not stood the winters for from twelve to sixteen years. Among this number was the Wealthy.

In the spring of 1878 I planted out nearly 1,000 of those seedlings and top-worked a good many more on Transcendent stocks. They are nearly all dead now.

The same spring I planted out forty Russian varieties raised from scions sent from the Agricultural Department at Washington to Mr. Sias. These trees are perfectly sound and hardy and have been bearing fruit for five years of as good a quality as any of the eastern fruit.

They are summer and autumn varieties. This proves to me conclusively that the Duchess, Tetofsky and the New Russian varieties are the only standard apples that farmers can depend upon for an orchard. I think I can convince any man that these statements are facts if they will take a walk with me in my orchard.

We must have trees acclimated to this cold climate, and as the Russians have been raised successfully for generations in a climate similar to our own, they are surely the best and safest for us to plant.

Observation has taught us that mercury can run as low as forty and even below and injure our trees but little if it only remains there for two or three days, which fact we had demonstrated very clearly lasr winter; but when it runs down as low as thirty and remains for two or three weeks with a northwest wind is when we need trees that for generations have been used to such exposure.

I think any person who attended the state fair last fall could not help being convinced that there are as nice apples raised in Minnesota and Wisconsin as are generally exhibited at any of the fairs in the eastern states.

I would not discourage the raising of seedlings. I believe it should be encouraged by state aid and be conducted at the experimental stations. The tendency with seedlings is to retrograde, and it may take as long a time to get them acclimated to the drying winds of Minnesota as it did to make the change from China to Russia.

Experience has taught us that one generation will not do it and as life is so short we naturally want to plant trees that there is some certainty of raising fruit from. Most of the nurserymen have them in stock—then let us start in by getting the right kind of trees and raised in Minnesota if possible and from a responsible nurseryman, and I am sure we will meet with success.

When we look back over the past twenty-four years, we see that our advancement has been slow except in hybrids, though I think when we get those new Russians reduced to twenty-five or thirty varieties, to include summer, autumn and winter, we shall have such fruit in Minnesota as we have been seeking after for these many years. Let me say again, that I would encourage the raising of seedlings, and in time they may succeed, but it is too long for farmers to wait. We want apples now, and with the experience nurserymen have already had with these new varieties they should be able to recommend to the farmer what he wants.

LOCATION.

Now, as we have the trees, next is location. A northern slope is generally recommended, though I believe there is more in the trees than there is in the location. A clay subsoil is desirable. There is an orchard in this vicinity that is on a very abrupt southern slope, so much so as to nearly protect it from the north and west winds, besides being surrounded with evergreens—that of Mr. Frank Whiton. He raises more tender varieties than we do on a northern slope. So it is my opinion that this matter of location is a mere excuse for nurserymen when they sell a lot of trees to a farmer and most of them die. When he complains they say your location is a poor one. So much for location.

CULTIVATION.

As to mode of plowing and cultivating orchard trees: Set them out sixteen feet apart each way. I find that to be ample room. I have forty-nine Duchess in a square, seven trees each way, planted in the spring of 1863. They are now quite large trees, yet there is ample room. By being planted close the wind strikes the first row and rises, and does not have force enough to shake the fruit off the inner rows. In this way they protect each other.

In setting trees I dig the holes deep and wide enough to receive the roots spread out to their full length; then, after filling in some surface soil in the bottom of the hole, set the tree in; if the ground is dry, turn some water into the hole. Have the tree four inches deeper than it was in the nursery row, lean the tree to the southwest so as to stand at an angle of about sixty-seven degrees, with the largest branches in the same direction, then put in some more surface soil and more water; lift the tree up and down a few times so the water can freshen the fibrous roots; then with dry dirt finish filling the hole and tramp in solid with the foot. In this way if there is any life in the tree it will grow. Two-year-old trees are preferable if not stunted.

By being inclined toward the southwest the sun has not the same chance to start the sap on that side of the tree in the early spring, and freeze and loosen the bark as when the tree stands perpendicular.

As the prevailing winds here in the summer are from the southwest, trees planted in this way generally straighten up and frequently are turned the other way. This has been my method of planting trees for a good many years, and I believe I have had as good success as anyone.

I cultivate the trees three years with a shovel plow, but never later than the first of July. To cultivate later keeps the wood from ripening for winter. Keep the grass from around the trees so the mice will not make nests around their roots and girdle them. If this is neglected when the first snow comes, tramp it around the trees and the mice will not trouble them.

After cultivating for three summers, mulch well as soon as the ground freezes in the fall. Seed to timothy and clover the next spring, and when it gets a good start, turn the hogs in to keep away the grubs and bugs.

Mulch each year with litter from the cowyard,—keep the

trunk smoothly trimmed to four feet high; there form the head. Leave all the limbs on the southwest side you can that will not interfere with each other; then what pruning is done after that should be done on the northeast side as the heaviest foliage always grows there. In heading trees we frequently have to form them from two or three leading branches, and there is danger of them splitting apart when they become large trees.

Some of mine were so badly split that I had to keep them tied together with ropes. To prevent this now, I cut scions, bevel both ends, and with the point of my knife make an incision in the bark and ingraft the scion from one of the leading limbs to the other like the round of a ladder. Use grafting wax the same as in ordinary way of grafting. These scions grow very fast being fed from both ends. In two or three years they become so large they can not be removed without the aid of a saw or ax.

VARIETIES.

I have already said that my apples are mostly summer and autumn varieties. Among them are Wealthy and Elgin Beauty, but they have to be kept very close to a protection to keep life in them.

I hope soon to be able to get a supply of winter varieties from among the New Russians. I assure you that at my age, I do not expect them from the seedling varieties to be originated. I will here give a brief description of my grounds for fruit purposes. I enclosed a field thirty by forty rods with a six board fence; a part of it is level and the balance sloping toward the north. I planted a row of white willows around it just inside of the fence. A few years ago thinking that willows could be improved upon for a windbreak, I grubbed them out on the south and west sides and substituted Norway spruce and balsam fir. I planted them eight feet apart, and mulched them well. They grew very fast, some of them are now twenty-five or thirty feet high, and their limbs lock together so closely as to almost bid defiance to the winds. I have besides on the south side three rows of plum trees. I divided this lot again into four equal lots by planting Norway spruce and Scotch pine both ways across the centre. The southwest fourth I use for small fruits and garden. The other three-fourths I use for an apple orchard. Now, with all this protection a large percentage of my apples blow off before

maturity. Not only is the windbreak necessary to keep the fruit from blowing off but it is a protection to the tree itself. Any person by looking over my orchard could convince himself of that fact. The trees near the windbreaks are sound and healthy and bear fruit almost every year, while those in the centre are either dead or are on the decline. I have no one in my mind who has raised apples successfully without a protection.

I think but little of the theory of some men of having a free circulation of air for fear of a scald. I think these men have never raised many apples in Minnesota, unless they tied them on with a rag. The tree might grow but it would never hold the apples long enough to ripen them.

My trees never have been scalded in that way though they have been scalded when the mercury ran as low as thirty or forty degrees below zero for two or three weeks at a time, with the wind in the north till the sap cells became ruptured and closed by the drying wind. While there is vitality enough in the trees to put out foliage in the spring, when the season comes for making what I call the second growth, the sap can go so far and no further, in consequence of the pores of the wood being closed and the vitality so near reduced, and hence when the sap can not circulate that part of the tree must perish. But trees on my grounds close to a protection are not as likely to scale as when isolated.

REPORT FROM RICE COUNTY.

By Seth H. Kenney, Morristown.

After a thirty years' residence in Minnesota and a good many years a member of this Society, we cherish a very kindly feeling toward its old members who have labored so hard to grow apples in this state. There is a sympathetic feeling begotten by meeting them annually and listening to their experience. We all reverence those early pioneers.

In looking at the labor of the nurseryman from a farmer's standpoint, we can not fail to admire this spirit of sacrifice, this untiring devotion that lingers with these men to the last hours of life. The best epitaph I could write on their record would be, "Ruling passion strong in death." Twenty-five years of orcharding in Minnesota makes the above words come home with peculiar force. If I take my own orchard of seven acres, and

the result that has been achieved in the twenty-five years, the cost, value of the necessary stock, the annual renewal of the sick trees and those that died, I have to confess that my courage has not been so enduring as that of many of my horticultural friends. It is true, the crab varieties have furnished considerable fruit. At one time the Wealthy gave great hopes, and the exhibit at New Orleans of that apple will long be remembered. The exhibit of Amber cane syrup was close to the apple exhibit. I heard many remarks that Minnesota must be a good place to live.

I bought trees and set many of them. To-day I have not a good Wealthy left. Duchess have stood with me better than Wealthy but the Duchess are prematurely old. I notice dead spots on the trunks, that effect the limbs. I found after the sap had begun to go up freely in the spring there came after a few days a cold night, and I found the bark raised from the wood by the sap freezing. The wood began to have a yellow appearance, nearly dry for want of sap. Hence it seems to me the trunks must have protection in this climate.

What shall I say about three hundred Ben Davis, a variety that once was noted iron-clad by our Society; also Haas Famuse, and a long list of trees that are hardly mentioned at present?

I have only a skeleton of the seven acres of the Transcendent crop. I think there are thirty-eight alive but they are not producing paying crops as formerly. They were set about twenty-one years ago; are ten inches in diameter. One Transcendent top worked with Whitney bore quite a crop the past season. Of the Whitney, six trees are dead or nearly so, and seven other trees are in very fair condition. They are apt to split if they are allowed to fork in training; with me not a very early bearer. Of thirty Hyslop set twenty-one years ago three trees produced two and a half bushels the past season; balance gone. Out of four Beech's Sweet two remain, looking pretty well; have borne well. Of twenty Stewart Sweet have two sprouts left that bore a few apples the past year. Early Strawberry, six planted, three of them alive; two of them have borne large crops every other year for many years. Wheeler's Red Winter, eight trees bore two barrels the past season, the first for many years to amount to anything. Of five trees of Hutchinson's Sweet only one remains; considerable blight on that. Nine Fall Orange, none of them healthy, most of them dead. Two Virginia Crabs, rather young trees, have borne some fruit for many years.

From the past experience, I should set but few varieties, such as Whitney, Transcendent, Beech's Sweet, and Early Strawberry.

We obtained a nice supply of red raspberries from Shaffer raspberry. The bushes do not sprout like Philadelphia or Turner, but grow like the black cap family; berries very large. It gives us better returns than any other variety. It is excellent to can for winter use,—the canes are largest and stand the winters best of any we have tried. We are testing Windom dewberry, planted last spring. The vines made a good growth.

Good nurserymen that grow their own trees, are the men that I always patronize. For these men I have a high regard. They are "Natures Noblemen." I do not look for them to realize the fullest reward in this life, but their failures will enable them to look for something better beyond than the short lived trees they tried all their lives to make live. Possibly in the near future some hardy variety may be brought out that will stand this severe climate, and produce a new industry.

REPORT FROM HOUSTON COUNTY.

By J. C. Kramer, La Crescent.

I send you a few words in regard to my experience with strawberries. I have been experimenting for twenty-three years, sowing seed every year, but mostly without result. During the whole time I have found but two varieties worthy of propagation, one of which is known as Kramer's Seedling No. 2. It is a profitable berry, yields well, one of the latest in ripening, and is a good market berry, always bringing a good price; hardy in winter or summer, a free runner, pistilate, very hard to pick. In order of ripening Crescent is first, Captain Jack next, and then Kramer's Seedling No. 2.

My new seedling, Early Princess is the most prolific bearer, if not the best of all the varieties I have tried, ripening a few days later than Crescent. It produces immense and strong plants, of healthy foliage, thick, green and bright; long stamens, thick and strong roots running straight down into the ground, which makes it a very strong plant. You can pick eight or more good berries from a single stem. For shipping it is one of the best. I sent three quarts to the summer meeting of the So-

ciety that were picked in a heavy thunder storm. After picking, they were placed in a large dish and the dirt washed from the berries and eighteen berries filled a quart box with fruit; the next contained twenty berries and the third twenty-two. They were in boxes for three days and were awarded first premium.

I desire to test these varieties more thoroughly before offering any of the plants for sale.

REPORT ON SMALL FRUIT.

By Wm. Lyons, Minneapolis.

The past season has been a remarkable one. Spring opened up later than the average; then came several weeks of cold, rainy weather, something very unusual in Minnesota. The summer was very cool, only a few warm days, followed by a long dry fall and up to the present time a remarkably mild winter. Aside from being a little late vegetables of nearly all kinds were an average crop; prices, however, ruling very low when the market was crowded. Potatoes were selling for 20 cents per bushel. When the Minneapolis flour trust put flour up to $7.90 per barrell, potatoes advanced to 35 and 40 cents per bushel and staid at these figures for several weeks—about the only good I ever knew a trust to do.

Fruit of all kinds yielded a good crop except grapes; the season was not warm enough for them; only the earliest varieties or those grown in favorable locations came to maturity. A hail storm in August destroyed mine and knocked off all the raspberries that were ripe at the time.

Strawberries were a large crop and found ready sale at prices above the average of former years. The stocks of shipped berries were very small at the time our home grown fruits were ripe and hence we did not come in competition with the foreign shippers. The quality of fruit on the market the past season was better than usual. Growers are beginning to find out that it pays to produce a first class article; it sells quick and brings more money, thus combining profit and pleasure.

Of the varieties which have done best for me I will name Countess, Crescent, Windsor Chief, and a seedling of mine which

has been named Martha. Of several new varieties on trial, only three of them proved valuable on my grounds, namely, May King, Bubach and Jessie. May King is a very promising variety; it is a good grower, not quite so productive as the Crescent; it is a little larger and better in quality; it has a perfect blossom and is about as early as the Crescent; free from rust. Bubach is one of the strongest growing plants I have; rusts a little, not enough to hurt it. It is productive and the fruit is very large, irregular in form, quality not very good; not a perfect blossom. I must confess I was somewhat disappointed in the Jessie, it did not bear as I expected, although I gave it the very best of care; petted it more than any other berry I ever raised; the quality was good but there was but very little of it. The blossoms dropped off; only about one in a hundred matured any fruit. Will give it another trial. James Vick, Old Ironclad, Cumberland and Wilson were almost total failures.

RASPBERRIES.

Raspberries were a good crop and were marketed in fine condition; owing to the scarcity of blueberries were in great demand and brought prices that were satisfactory to the producer. The varieties grown were Turner, Cuthbert, Philadelphia and Schaffer of the red, Gregg and Nemaha for black. When we come to talk about varieties we have a long list to choose from, both red and black, but my experience being limited to a few of the leading varieties I have named only such and would say to those who wish to plant, if you know of a variety that is doing well in your vicinity that is the one for you to plant. Some varieties do well in certain localities and are almost worthless in others. It has been my motto to test all the new varieties as they are brought out in a small way and not to plant extensively of any variety until it has been tested, no matter how it has done elsewhere. Turner and Cuthbert maintain their place with us as the best red market raspberries. Shaffer is a mammoth berry and makes a large wood growth, berry a dark crimson color, good quality, does not sucker, but roots from tips like blackcaps, sells well when known, but its color is not attractive.

VERBAL REPORTS.

Mr. Sias. I havn't had time to prepare a written report. We have added but little to our experimental station since our last report. We received about sixteen varieties of Russians from the state experimental station. We put them out and they have done very well. We have set a few of the Russian poplars and willows, and several varieties of evergreens. We have some new varieties of raspberries and strawberries. We have added the Johnson Sweet raspberry.

Mr. Cutler. How did your thornless blackberry do the past year?

Mr. Sias. I would say the experiments made with the thornless blackberry have not been very satisfactory. The old bush when we first found it had never been protected; I got a quantity of the plants and put them out. The first hard winter killed them to the snow line. They have sprouted out, but have not done very well this year; by covering them they may do tolerably well. We havn't had sufficient time to test them, and havn't given them up as being worthless.

Mr. Fuller. I wish to say a word in regard to my Russian trees. I have one Russian pear that is over eight feet high. It killed down two years ago, but it is now doing better than any of the apple trees received from the same source. The willows I regard very highly, especially the yellow, which is very ornamental. I put in some two acres of cuttings last spring, and although I trimmed them up close, they have grown some four to five feet, and have spread over the whole ground. I think it will make one of the very best windbreaks we have. The limbs spread out over the ground. The laurel-leaved variety of the willow I think highly of. One tree is some ten feet high, and is one of the most beautiful things on my place. It grows readily from cuttings. I have a sprout that made a growth of nearly nine feet last summer. These are the finest poplars I know of. They make fine trees for shade. The leaves are very ornamental indeed. They seem to be perfectly hardy.

Secretary Hillman said he had visited Mr. Fuller's grounds at Litchfield recently and could corroborate what had been said. He had been surprised and pleased with the many evidences of careful culture and good taste there displayed; of what was formerly a smooth piece of prairie land, in a few short years Mr. Fuller

had made one of the finest and most ornamental tracts of land he had even seen, and had surrounded his home with beautiful evergreens, shrubbery, etc. This was a good illustration of what could be accomplished by planting out ornamental trees, by means of careful training and culture.

Mr. Smith said if anyone would travel much through the state he would be compelled to give the nurserymen credit for the influence exerted in promoting the planting of trees in this state. There was no town north or west of Minneapolis in the state that had such an abundance of well grown, tastefully planted deciduous and evergreen trees as this pretty little town of Litchfield. A stranger passing along on the railway could very easily recognize those towns where the enthusiastic nurserymen were located. Among the number he had in mind were Litchfield, Rochester, Fairmount, and Lake City, which would compare with any towns in the Northwest for the number of beautiful trees, tastefully arranged and well grown. This was also true of Faribault, where there are many evergreen hedges, both of spruce and arbor vitæ—some of the finest to be seen in the United States.

Following is the report of Mr. Sias, delegate to the Northern Iowa Horticultural Society:

NORTHERN IOWA HORTICULTURAL SOCIETY.

By A. W. Sias, Rochester.

The Northern Iowa Horticultural Society held their fourth annual meeting at Nora Springs, Floyd county, Dec. 19 and 20, 1888. President W. C. Haviland, of Fort Dodge, being absent, Vice President R. P. Speer, of Cedar Falls, presided.

The speech of welcome by the Rev. Mr. Kent was eloquent and witty, while the response by H. W. Lathrop, Ex-President of the state society, Iowa City, was rich and good. The attendance was good throughout, and the free entertainment given by the people of Nora Springs, was first class in every respect. The fruit exhibit far exceeded my expectation. J. S. B. Thompson, of Grundy Centre, Iowa, exhibited fifty-three varieties of apples, forty-one of which were seedlings, which made a grand display. C. G. Patten exhibited thirty-three varieties, seventeen of which were seedlings, fourteen Russians and two German sorts. His

seedling Duchess No. 3 he regards the best. I can testify to its fine appearance and quality. Mr. John Harroon, of Newport, Iowa, formerly of Olmsted county, Minn., also made a creditable showing of apples, as did many others. When President C. G. Patten of the state society, and Prof. J. L. Budd, of Ames, met in debate, it reminded me of the old saying, viz.: "When Greek meets Greek, then comes the tug of war." And as each party handled his part so skillfully, that the last speaker was invariably ahead, it also reminded me of the words of Gen. Washington — "To be prepared for war is one of the most effectual means of preserving peace."

I have been somewhat discontented in Minnesota since my return from Iowa, to think that the young people down there are so much ahead of ours in horticultural work. They turned out nobly at Nora Springs and vicinity, both ladies and gentlemen, and entertained us splendidly with music and declamations. The hard winters and summer droughts have killed off the trees there nearly as bad as with us, and they are just about as much at a loss to know what to recommend for general cultivation as we are. I had the pleasure of meeting Mr. Geo. Van Houghton, of Lenox, secretary of the state society, and Mr. John C. Ferris, secretary and treasurer of the northern society, at Mr. Edson Gaylord's before the opening of the meeting. Mr. Van Houghton is not a stenographer but one of the most rapid writers I ever met, and a good talker. Mr. Ferris is also a good worker, and understands his business. Iowa is considerably ahead of Minnesota in her horticultural work, largely owing to the fact that the state gives her state society $1,500 a year more than we get, which enables them to keep up many more societies than we have, and to keep them in a much better running order.

One of the most efficient, energetic workers in the good cause of horticulture in Floyd county, is Edson Gaylord of Nora Springs. He exhibited a large number of botanical specimens of native wood, and of fruit trees, to illustrate his address on the subject of Sunscald. Mr. Gaylord kindly presented the same subject to the Southern Minnesota Horticultural Society, on the second day of the present month, and I am in hopes it will get into our next report. I am convinced that whoever follows Mr. Gaylord's plan of planting and caring for fruit trees, will surely reap an abundant harvest, right here in Minnesota, as all intelligent horticulturists know that we are several degrees south of the north line of the apple belt.

In conclusion I will state that no gardener can rub against such live men as C. G. Patten, Prof. J. L. Budd, R. P. Speer, H. W. Lathrop, Edson Gaylord, Geo. Van Houghton, J. C. Ferris, N. A. and E. M. Reeves, and many other good men that we met at Nora Springs last month for the first time, without learning something to his lasting benefit.

On motion of Col. Stevens, Mr. Smith was elected a delegate to the meeting of the Wisconsin society to be held at Madison in February.

Mr. Smith called attention to the reduction of rates of freight on nursery stock, and said it had been secured largely through efforts of members of the American Nurserymens' Association and the personal efforts of S. M. Emery, of Lake City.

A vote of thanks was given Mr. Emery for his efforts in this direction.

Mr. Harris, from the committee on nomenclature, recommended that hereafter in the transactions when the Early Princess strawberry is mentioned it be referred to as Princess. The name given to the variety might convey an erroneous impression as to its being an early variety.

Mr. Harris, from the committee on classification of fruits, presented the following:

Your committee would respectfully report, that after a careful examination of the catalogues of fruits, as made up by the American Pomological Society and the societies of various states, we have come to the conclusion that this is one of the most essential things for the promotion of horticulture in the Northwest, in order that our fruits may be properly catalogued and classified, on a similar plan to that adopted by the Michigan society, and the report placed within the reach of members of this Society; and we would respectfully recommend that such catalogue be prepared for publication, and the executive committee be instructed to make the necessary arrangements for so doing.

On motion of Mr. Underwood the report was adopted.

Mr. Wilcox, from the committee on constitution presented the following, which was adopted:

Any person may become a member by paying to the secretary or treasurer an annual fee of one dollar, or a life member by the payment of ten dollars, provided that life members may pay the fee of ten dollars in two equal annual payments of five dollars each.

Local or county horticultural societies and kindred organizations may become auxiliary to this Society, and their members entitled to all the rights and

privileges of membership, by sending three delegates, furnishing a list of members and a report of the proceedings thereof to this Society at its annual winter meeting.

Honorary members, for a time stated or for life, may be elected at any annual meeting by a two-thirds vote of the Society.

Mr. Harris presented the following report on Entomology:

REPORT OF COMMITTEE ON ENTOMOLOGY.

By J. S. Harris, La Crescent.

Mr. President and Gentlemen:

I find my name appears as a member of the committee on entomology and suppose that a report is expected at this meeting. I have not very much of interest to report.

In the year 1888 some species of bugs have been as festive as of yore; others seem to have taken a partial lay off to recuperate, or perhaps to prepare a protest to wise members of our legislature against the extravagance of providing for a state entomologist, or possibly it might have been presidential year with them and they have neglected business in order to get the biggest bugs into office. Neverthless a few of them have put in good time.

The canker worm (*Chalaena vernata*) were not nearly as numerous as they had been for a few seasons just preceding, and they did but very little injury to our apple trees. This fact should not throw us off our guard or decrease our watchfulness. This insect is subject to attacks from many enemies or it might soon get beyond human control. I presume the drought of last year (1887) caused a scarcity of food for the birds and that they preyed upon them more than usual during the season.

The American tent caterpillar (*Clisocampa Americana*) which was so plentiful in 1886 and 1887, preying upon almost every kind of tree and shrub, was scarcely observed last year. I do not know that any bird feeds upon it; they may possibly in in seasons of scarcity. (For a fuller description see Vol. 15, page 366.)

The white grub larva of the May beetle has been very destructive to strawberry plantations in portions of the state.

Cabbages were considerably infested with worms of at least

four species, viz.: larva of European butterfly, cabbage plusia, zebra caterpillar and a smaller one that I have not had time to look up. The European butterfly was not as plentiful as in past years; in fact early in the season they were rare, and we are led to hope that some parasite is doing effective work toward their subjugation. The plusia was the most plentiful of the four.

A new insect committed depredations upon strawberry plants at La Crescent, eating the leaves entirely away except the ribs, causing considerable destruction. Small flea beetles were found upon the plants and the mischief is laid to them; but so far no investigation has taken place. As a rule potato beetles did not do so much damage as usual. This report is from Southeast Minnesota.

The following report was made by Mr. Harris:

THE SOUTHERN MINNESOTA FAIR.

The above fair was held at Rochester the first week in September, during the week preceding the state fair, and in most departments was a marked success, especially so in the horticultural department. The floral exhibit filled the entire centre of the main exhibition hall, and was one of the most beautiful and attractive features in the building. The competitive entries numbered eighty-two. Smith & Darling, commercial florists of Winona, were the most extensive exhibitors. Their plants were healthy and well grown, and the collection embraced the rarest and most popular of Flora's bright gems. The place and manner in which they were arranged for display added greatly to their attraction and conspicuity. H. W. Stedman, Mrs. J. Hyde and D. C. Dewitt of Rochester, all made extensive and very complete exhibits of collections. Mrs. M. Luther, Mrs. C. A. Whited, Mrs. H. Stern, Mrs. Neiston, Smith, Cook, and others, made fine displays in specialties. The collections and displays of apples were fine, but being shown in a low, unattractive, poorly lighted building, cramped for room, for an artistic display, more than half the value as an object lesson and telling feature of the fair, was lost. The number of entries in the apple department was one hundred and seventy-two, including six large and complete collections. The exhibitors of collections were A. W. Sias, Rochester; Wm. Somerville, Viola; E. H. S.

Dartt, Owatonna; C. H. Greenman, Chatfield; R. C. Keil, Rochester; Sidney Corp, Hammondsford. The entries on single plates numbered one hundred and fifty-six, and the principal contestants were Messrs. Sias, Dartt, Somerville, Krahler, Keil, Greenman, Hoag, Newton, Ottman, Pond, Farrier and McHenry. The fruit filled about six hundred plates, and was very fairly colored and free from marks of insects or worms.

In greatest number of varieties by professionals, Mr. Sias seemed to be in the lead. As an amateur, Mr. Somerville outstripped all competitors, having a number of well grown Russian varieties. His exhibit was a centre of universal interest. Mr. Keil's collection was a large one, but included a considerable number of varieties that were unnamed. In Mr. Somerville's collection of Russians we noticed the Green Streaked, a variety about the size of the St. Lawrence, Russian Wax, a good eating fruit of beautiful appearance, Golden White, White Pigeon, Red Black, Yellow Transparent, Green Selonka, and others; C. H. Greenman had about a dozen varieties of Russians, several of them of fair to good quality. Sidney Corp had fine specimens of the McMahan White, Wealthy and a few Russians. J. W. Hart showed the three varieties of Brett Seedlings, Hart, Brett and May. The quality and the appearance of the fruit was good. The exhibition of vegetables was not quite equal to that of some previous years, but in some departments was excellent. There was a noted absence of mammoth pumpkins and squashes.

Before closing we desire to make brief mention of a feature in this fair that to us was a new departure, both novel and instructive. This was found in the school exhibit and we think will prove to be a valuable educator. It was a very complete collection of garden, grain and field seeds, put up in small glass bottles, plainly and correctly labeled and four sets of the woods of Minnesota correctly named and tastefuly arranged to show the bark and grain; also some collections of the rocks, pebbles, etc., of Southern Minnesota. These exhibits were made by children of different school districts and were called out by offers of prizes to the ones having the best. We predict that some who assisted in getting up those collections will grow up to be good and useful citizens and return to the world many times the value expended in those premiums.

Mr. Wilcox offered the following resolution which was adopted:

Resolved, That members of the Executive Committee be allowed mileage and traveling expenses and authorized to expend such sums from money in the treasury in carrying on the work of the Society as its interests may require.

The salary of the President for the ensuing year shall be fixed at $25; of the Secretary, $500, and of the Treasurer, $25; that the vice presidents be allowed their traveling expenses.

Mr. Barrett, from the committee on final resolutions, reported as follows, which was adopted:

FINAL RESOLUTIONS.

Resolved, That the thanks of the members of the State Horticultural Society are due, and are heartly tendered to the generous citizens of Minneapolis, for their hospitable entertainment and courtesies extended to, and comforts enjoyed by us, during the present session.

Resolved, That our thanks are due to the following railroad companies for returning us to our homes at reduced rates of fare—viz.: Chicago, St. Paul & Kansas City; Wisconsin Central; Chicago, St. Paul, Minneapolis & Omaha; Chicago, Milwaukee & St. Paul; St. Paul & Duluth; St. Paul, Minneapolis & Manitoba; Minneapolis, Sault Ste. Marie & Atlantic; Northern Pacific; Minneapolis & St. Louis, and the Burlington & Northern.

Resolved, That this Society is extremely grateful to Prof. W. H. Ragan, of Greencastle, Indiana, the distinguished horiticulturist and secretary of the American Horticultural Society; to Mrs. V. H. Campbell, and A. J. Philips, of Wisconsin; to Elmer Reeves, of Waverly, Iowa; to Thomas Frankland, of Stonewall, Manitoba, and to C. C. Bell, of Boonville, secretary of the Missouri Central Horticultural Society, for their attendance during our session; assuring them that we have received useful stores of information from their wise instruction during our deliberations.

Resolved, That the thanks of this Society are hereby tendered to the papers of the twin cities that have so faithfully reported the proceedings of the Society during our session.

Prof. Ragan. Mr. President, through your action this forenoon you have highly honored certain wandering stars who have been in your midst and enjoying your hospitalities during this week, in which number I presume I am included. For this honor and the one now proposed by these resolutions, I feel highly grateful toward you. During the four days I have spent with you I must say that I have enjoyed this privilege as highly as on any similar occasion within my memory, and it has been my privilege to attend horticultural gatherings for the last thirty years. I have attended meetings of this character in numerous states, and as a state organization, I must say, Mr. President,

without especial flattery to you or to your people, that none have been conducted more ably; none have included more interesting discussions and papers than have the meetings of this week. I shall ever esteem it as a high privilege that I have been enjoying this past week among you. I shall return to my home feeling that I have been benefited by being in your midst. Of one session especially, I wish to speak. I must say that on yesterday evening your entertainment in this hall was worthy of an audience of thousands. People have often paid door fees to attend literary entertainments, simply viewed as such, that were not equal to your entertainment in this hall last evening. I thank you again for the honor you have shown me.

President Elliot. Speaking for the members of our association, we feel that we have been greatly honored by the presence of these friends that have come here; that have come from the east, from the north and from the south. We have not only been instructed, but have been helped by their presence, and feel it will add increased interest to our organization.

Mr. Grimes. I would suggest that this Society send two delegates to the next meeting of the American Horticultural Society, to be held in Texas, one to bear his own expenses.

Col. Stevens. I should object to that. I should hate to go with my expenses paid, while my friend Grimes was able to defray his own expenses.

Prof. Ragan said as the matter had been mentioned, he would say that he hoped all would consider themselves as delegates and invited to that meeting; it would be second to no other, unless perhaps, the one held in California. The citizens of Texas were making arrangements for the meeting, which would be held in February, 1890. He had already been in correspondence with parties interested concerning the arrangemeuts for the meeting.

President Elliot. Friends, we are about to close our annual session, and I hope that you all have been paid for your coming here and taking part in this meeting and in these discussions. I hope that when you go home you will not lay down your enthusiasm, nor let the work lag for want of your support. We desire that everyone should feel that he has something to work for in this great Northwest, in the line of horticulture. We hope you will all come again next year feeling that it has been a profitable one, and that you may have made greater progress than in any preceding year. We want you to feel that you have been guided and directed aright by those you have placed in charge, and that

they have the interest of the Society at heart, and that they are with you at work in the same cause. We know that many of us have large interests to look after, besides our own horticultural work, and it takes very much of our time. We hope that you will bear with us if we do not always do just as you think we ought to. Sometimes our task seems to be burdensome, but we feel that on the whole, it pays us well for the time and money that we spend in this character of work. If we do not reap the benefit ourselves, perhaps others will; future generations may derive some good from our work, and feel that we did not live and work in vain in our time. We may possibly give some aid to others in this good cause in which we are all striving to become more enlightened.

In regard to the work of legislation before the committee, I wish to ask each and everyone who may have suggestions to make to put them in writing and forward them to the committee, so they may know what your wishes are. And wherever you can put in a word for our Society, we hope you will do so and not say you have no interest in our work. Every new member that you can get will add so much more to the interest of the cause. The work committed to us to do in this life, we should do with all our might, and we trust it will be done faithfully and well. Some of our members have spent a good deal of time in this work without receiving any pecuniary compensation or reward, but I hope and trust that you will continue to do all in your power to forward the interests of this Society.

Mr. Frankland. Mr. President, in looking around the room I have felt myself a privileged member of your Society. I did not expect to receive such kindly treatment at your hands, although I have traveled a good many miles, and came from beyond the boundary to attend this meeting. I came to learn, and desire to return my thanks to this Society for giving me such very kind and useful instruction. I have been amply repaid for my visit; and if at another time I can make the necessary arrangements, I shall be very happy to visit Minneapolis, or some other place where your Society may meet again.

Mr. Reeves. I wish to thank the members of the Horticultural Society for courtesies shown me and for honors conferred, both on my account and the state I have the honor to represent. I hope that any who can do so, will visit the Iowa society whenever you have the opportunity, and I wish to give you a cordial invitation to attend the next meeting of the Northern Iowa hor-

ticultural society, to be held next December, at Waverly. That is my home, and those who can honor us with their presence at that time will be welcome, and we will try and entertain you as well as you have me during the present session.

Mr. Philips. I want to thank the members of this Society for the courtesy it has extended to your delegates from Wisconsin. I feel that I am indebted to this Society in many ways. When I go out and find my top-worked Wealthy trees doing so nicely, I feel somewhat encouraged. They were top-worked on Virginia crab, and were some my friend Mr. Grimes, sent me; when I see them I always think of him. When I see the Orange and Minnesota hybrids, I think of my lamented friend, Mr. Jewell, who gave me almost my first instructions in orcharding. And as far as that is concerned, I think of you people almost as often as I do of the horticulturists of our own state. Our two states are only divided by the Mississippi river, and we feel where I live, that anything that you may have in Minnesota, that is hardy enough to endure this cold weather of 40° or 45° below—any of the new seedlings or Russians, which you are all looking for so anxiously—which will help you out will also help us out.

I have been charged by the fruit men as being down on the Russians; I am not. I have advised people when they invest in them, to go carefully, and to be sure they were right. As soon as we recommend anything to be strictly ironclad, we will very soon find all the tree peddlers supplied with them. A tree peddler called on me last summer, and said the Hibernal was a good tree, when I asked him about it. He said he had seen it in Minnesota. I took him out and showed him a tree and asked him what he called it, but he could not tell me. I told him that it was the Hibernal. I want to thank you for the kindness we have received, and in the language that has often been expressed, hope you will still go on and prosper.

On motion of Col. Stevens, the meeting then adjourned *sine die.*

All the meetings of the Society were well attended and much interest was manifested in the discussions had and papers read. The following is from *Farm, Stock and Home:*

"The meeting was characterized by many as the best ever held by the Society. The proceedings were extremely pleasant and harmonious; the papers read were terse, brief and practical. The discussions were earnest and able, and the value of the suggestions and information given and received is past all computation."

Owing to the fact that a number of papers are published which were not upon the regular program, we are compelled to omit a number of interesting papers read before the Southern Minnesota Horticultural Society and the McLeod County Horticultural Society, besides many editorial clippings of considerable interest. We have exceeded the limit of space usually given to the routine report and we make this statement in explanation of the omission of the secretary's portfolio. We shall, however, make room for two or three reports and papers which should appear in this number.

MINNESOTA STATE BEE ASSOCIATION.

On the seventeenth of January last the Minnesota State Bee Association was organized by several of the leading bee keepers of the state, who were in attendance at the State Horticultural Society. The officers elected were: President, L. H. Wilcox, Hastings; vice president, Wm. Danforth, Red Wing; secretary, Wm. Urie, Minneapolis; treasurer, J. G. Bass, St. Paul. Executive committee, B. Taylor, Wm. Dwyer, J. G. Bass. The secretary writes:

"This association is organized for the purpose of bringing all the bee keepers and others who are interested in apiary culture together, for their mutual instruction and improvement regarding methods of managing bees, and other things that may be to the advantage of them and to those about to engage in the business. The first meeting will be held at the experimental farm the same day the horticultural society meets, of which due notice will be given."

It is hoped that all who are interested in bees, either as professionals or amateurs, will send their names to the secretary, and lend their co-operation to this movement. *Farm, Stock and Home* heartily welcomes this evidence of an increasing interest in the refining and instructive industry of honey production, and it hopes to see the association have a large and active membership. It also hopes that the music of busily working bees will be much less rare in the Northwest.—*Farm, Stock and Home.*

The following brief biographical notice is from the pen of Col. J. H. Stevens, who has been an intimate friend of Col. Robertson since his arrival in Minnesota:

COL. DANIEL A. ROBERTSON

Was the first president and one of the principal founders of the Minnesota State Horticultural Society, a very good likeness of whom appears in frontispiece (furnished at the special instance of the committee on publication), has led a useful and eventful life. Born in Philadelphia, Penn., May 15, 1813, at the age of eighteen years he went to New York, in which city he pursued various studies including the law. From New York he removed to Ohio, where he was admitted to the bar in 1839. He became interested in journalism and at one time was the editor of the Cincinnati *Enquirer*, associated with Chas. Brough; subsequently he edited the Mount Vernon *Banner*. In the meantime he gave much attention to pomology and horticulture; becoming familiar with the habits, propagation and growth of fruit, as well as forest, shade and ornamental trees and shrubbery at his farm adjoining the city of Lancaster. In 1845 he was appointed United States marshal for Ohio, holding the office for four years. In 1850 he represented Fairfield county in that state in the constitutional convention, but resigned after the summer term and came to Minnesota in the autumn of that year. Soon after his arrival in St. Paul he established the Minnesota *Democrat*. Under his able management it became one of the leading journals in the Northwest. In 1856 he visited Europe; during his absence abroad he studied various scientific subjects connected with horticulture. After his return to St. Paul he was elected a member of the house of representatives of the state legislature. He was instrumental in organizing the "Legislative Farmers' Club" during the session of 1859–60, which was fraught with much moment to the state. In 1860 he was elected mayor of St. Paul; sheriff of Ramsey county 1863; re-elected in 1865 and 1867. He organized the first working Grange of Patrons of Husbandry in the United States at St. Paul. He was the first professor of agriculture in the state university. His lectures were useful and instructive. He introduced the Russian apple into the Northwest. For the past few years he has spent much time in Europe, bestowing attention to climatology and various scientific subjects that are of interest to agriculturists and others in this country. Several years since he established the Minnesota *Monthly* in St. Paul, in the interest of the horticulturists and farmers of the state. He has lent a helping hand in almost everything that would benefit the people of the Northwest. The "fruit" of his labor in Europe will be published in the near future.

The Committee on Obituary presented the following report:

IN MEMORIAM.

ROBERT HALE.

The Society, since its last annual meeting, has sustained a great loss in the death of one of its most honored members—that of Robert Hale, Esq., late secretary of the board of trade of this city. Mr. Hale was born in the little village of Boscawen, N. H., Oct. 1, 1815, and died at Minneapolis, June 28, 1888. He came to this city in 1871, and resided here constantly up to the time of his death. In relation to his eventful life, a committee appointed by the board of trade from its members, in its report says:

"A life surpassing in all the excellencies and virtues which adorn the highest type of a broad, a sturdy, and a noble manhood, a life as pure as the golden sunbeams which warm the earth and as tender and sweet as the fragrant flowers which turn their beautiful faces to the morning sky, has passed suddenly away and brought us here with our hearts in grief and mourning today. Your committee do not feel competent to eulogize Robert Hale. He was truly a most remarkable man. His whole life was a record of worthy and honorable action. From his boyhood to that hour when he so suddenly fell at our feet, no single action of his life ever tarnished the perfect brightness of his personal honor. In every relation of life he seemed, indeed, a perfect man. No impure thought could find a place in his mind; no mean or selfish purpose could find a corner in his pure heart; and and no unworthy object or cause could command his obedience or support. He loved his fellow men; he loved this our city in which he lived, and died; he loved his associates in this board. He loved and was ever true and faithful to his friends, and he loved and worshiped God. He was a perfect husband and father, and he made his home and family as happy as human love and affection can make a home. To his neighbors he was kind, and to all he was courteous and considerate. To the young he was the giver of kind and useful advice and encouragement; to the busy man of affairs he was a careful and prudent counsellor, and those who walked beside him in the soft sunshine of life's afternoon he lifted up and made joyous by the inspiration of his own unfaltering, loving faith. Wherever he went among men, and

especially upon those who were blessed by the possession of his beautiful friendship, his kindly and sympathetic greetings fell like a benison, and drew to him their loving regard and confidence. The great value of Mr. Hale's services to this board, through it to the city of Minneapolis, can not well be estimated. Enthusiastically loyal to every interest of our city, and faithfully devoting himself to her service as secretary of the board of trade, he contributed largely to the many valuable results which have been secured for the city through its instrumentality."

Your committee wish to add to the above, that he was fond of horticulture. His beautiful grounds in this city were adorned with choice flowers. He delighted in experimenting with such fruit as could be grown in this state. His garden always excelled in vegetables of every description. He greatly enjoyed our meetings, seldom, however, taking part in them, but at our last annual meeting was prevailed upon to furnish a valuable paper, which he read before the Society.

In conclusion, your committee would respectfully suggest that this report be spread upon the records of the Society.

Respectfully submitted,

JOHN H. STEVENS,
JOHN S. HARRIS,
S. D. HILLMAN,
Obituary Committee.

HON. J. H. BROWN.

It gives us pain to chronicle the death of Hon. John H. Brown, which occurred June 18, 1888. Returning alone from Dawson to his home in Providence in a thunder storm he was struck by lightning and instantly killed.

Mr. Brown, was born Dec. 31, 1818, in Sullivan Co., N. Y., the fourth in a family of eleven children. When about ten years of age the family removed to Cortland county remaining three years, thence removing to Loraine county, Ohio. In 1837 they removed to La Salle county, Ills., and two years later to De Kalb county. In 1844 he was married to Miss Calista Sandborn, daughter of a near neighbor, and purchased a farm close by, turning his attention for the next few years to agriculture and the raising of fruits in which he was very successful. In 1856, his health failing, Mr. Brown decided to remove to Minnesota, coming to Pleasant Grove. He embarked in mercantile

business but the hard times of 1857-8 forced him to discontinue, and removing to Rochester he continued in business until 1870.

At this time the new town of Lac qui Parle, attracted his attention and the family removed to that place, where he preempted a quarter section of land one-half mile north of the village. He built a commodious and well fitted hotel and is most pleasantly remembered as its genial host and proprietor.

In 1873, at the establishment of the Lac qui Parle county agricultural society — largely through his interest and efforts — he was elected its first president.

During leisure hours he might be found planting and fostering the growth of the trees which he seemed to love, leaving them as footmarks, wherever he was. Anyone visiting Lac qui Parle cannot but remark Mr. Brown's place as it is known with its wealth of beautiful trees. The road on two sides is lined with three rows and the southeast forty acres is laid out in a delightful grove where he purposed sometime erecting home buildings, which purpose will be carried out by his daughter, Mrs. Nichols. Lac qui Parle owes much of its acquired beauty to the refined taste and industry of Mr. Brown.

The cares of hotel life proving too burdensome he sold the property in 1885, and retired to his homestead secured some years before in Providence, to make for himself and wife, as he expressed it, a home for their old age.

He was elected in the fall of 1886, representative to the state legislature, where he was honored with the chairmanship of the committee on forestry, and was an active member of the committee on public lands.

For years he was an active and interested member of the state forestry association and State Horticultural Society, and was a prime mover in such modification of the tree claim laws of the United States as should make them practical and reasonable.

At Evergreen Farm Home, as he was wont to call it, he gave full expression to his fancies, and a "home" it was indeed. Surely he solved the problem of tree planting on these bleak western prairies.

Of the large family but two brothers and two sisters survive him. His widow, and an only daughter, Mrs. Browning Nichols, Lac qui Parle, and an only son, Emslie Brown, of Plainview, have the sincere sympathy of a large circle of friends.

Under a grassy mound at Evergreen Farm, surrounded by the trees he loved so well, rests all that is mortal of the excellent citizen and honest man, John H. Brown.

MEETINGS OF THE EXECUTIVE COMMITTEE.

A meeting of the executive committee of the Society was called at the office of Dr. Elliot, No. 427 Nicollet avenue, Minneapolis, at two o'clock P. M., Feb. 27, 1889.

There were present President Elliot, the Secretary, Messrs. Latham, Underwood, and Wilcox of the committee, J. T. Grimes, E. Nagel and C. L. Smith.

The premium list, in the division under the charge of the Society, was taken up for revision, the same to be submitted to the board of the State Agricultural Society for final action and approval. This work was not completed at this session, however, and the meeting was adjourned for one week.

March 5th an adjourned meeting of the executive committee was held at the office of Dr. Elliot, at ten o'clock A. M. of that day, pursuant to previous appointment.

Present, President Elliot, and Messrs. Latham, Harris, Underwood, Brand and Wilcox, of the committee.

The revision of premium list was further considered, after which Mr. Underwood presented an outline of program for the next annual meeting of the Society. Mr. Brand suggested in assigning topics for discussion the grape, strawberry, orchard and forestry were the questions of most importance; these should be thoroughly considered.

Following is an outline of program, the same to be subject to such further revision and change as may be deemed advisable, to be made at time of summer meeting:

Monday Evening.—Organization, appointment of committees, reports of local societies, vice presidents, etc.

Tuesday Morning.—Strawberries, culture, varieties, marketing, currants and gooseberries. *Afternoon.*—Raspberries, blackberries, dewberries; culture, varieties, marketing. *Evening.*—President's address, reports of secretary and treasurer.

Wednesday Morning.—Orchards, apples, location, culture, varieties, marketing, keeping, etc. *Afternoon.*—Grapes, culture, varieties, marketing, keeping. *Evening.*—Evergreens, ornamental and shade trees, forestry.

Thursday Morning.—Green houses, flower gardens, roses, ornamental shrubbery, landscape gardening. *Afternoon.*—Election of officers; vegetables, market gardening, etc. *Evening.*—Musical and literary program.

Friday Morning—Apiary culture and sugar. *At Noon.*—Bas-

ket picnic, toasts, songs, informal business, final resolutions, adjournment.

A list of standing committees was named as appears elsewhere.

On motion it was decided to advance the meeting one session, holding the first session on Monday evening.

On motion of Mr. Wilcox the duty of assigning topics for the apiary department was referred to state bee keeper's association.

On motion of Mr. Underwood it was decided to hold the summer meeting at the state experimental farm, near St. Anthony Park.

The matter of cataloguing fruits was discussed and on motion referred to a special committee consisting of Messrs. Wilcox, Harris and Hillman, to report at next annual meeting.

On motion the President was appointed a committee of one to invite the amber cane association to turn over the funds to the treasury of the Society.

The following bills were audited and allowed, to-wit: A. W. Latham, $2.58, J. W. Underwood, $5.50; J. S. Harris, $6.35; O. F. Brand, $3.64; L. H. Wilcox, $5.70; C. L. Smith, delegate to Wisconsin, $15.10.

The President and Secretary were authorized to make such changes as were deemed proper in program and to publish same in the report.

The meeting then adjourned.

REPORT OF DELEGATE TO WISCONSIN.

By J. S. Harris, La Crescent.

The one marked and important event of the year to the Wisconsin farmer is the assembling of the annual convention of the State Agricultural Society, State Horticultural Society, State Dairymen's and other kindred associations at Madison in the first week of February, each year. These have been held regularly and have continued to gain in interest and importance for a score of years.

Madison, the capital city of Wisconsin, is a beautiful and thriving little city, claims a population of 16,000, and is situated in the geographical centre of the best and most fertile farming ands of the state. The state house is one of the largest and

finest in the Northwest, furnishing ample room for the legislature, state offices, State Horticultural Society, State Agricultural Society and headquarters of the superintendent of the farmers' institutes. Everything about the capital is in harmony with the greatness, wealth and prosperity of the state, and points to the fact that agriculture is recognized as the bed rock upon which this prosperity is founded. The present meeting, February 5th –9th, was one of the largest and most enthusiastic ever held in the state. All railroads carried delegates the round trip for a single fare, and nearly every county in the state was represented by energetic and progressive tillers of the soil.

THE HORTICULTURAL SOCIETY.

The meeting of the State Horticultural Society was formally opened on Monday evening, February 4th. The time was chiefly occupied in receiving reports from absent members and discussing the merits of popular varieties of fruit. The forenoon of Tuesday, the fifth, was chiefly taken up in the disposition of business matters and the setting up and arranging of the magnificent exhibition of fruits. The exhibition was comprised of something over 600 plates, chiefly apples, and a few vegetables. Chas. Hirschinger, Baraboo, showed 40 varieties of standard apples, 13 of seedlings and 7 of Siberians, in all 160 plates. George Jeffrey, of Milwaukee county, showed 60 varieties of standard apples, 8 of Russian, 8 of Siberian, 3 of winter pears, about 130 plates in all. Geo. P. Peffer, of Pewaukee, had about 40 varieties of standard apples, 29 of seedlings, 1 of pears and 6 of grapes. G. J. Kellogg, of Janesville, 12 varieties of apples, 6 plates of grapes and a good display of garden vegetables. James O'Zane, of Kenosha county, showed 11 varieties of very fine apples, among them some that are rarely fruited in the Northwest. F. H. Chappel, of Dane county, showed 20 varieties of standard apples and several fine seedlings. E. Wilcox, of LaCrosse county, showed 15 varieties of standard apples and several seedlings, and was awarded the first premium on seedlings and on the Wealthy. A. G. Tuttle, Baraboo, showed 15 varieties of standard apples and about the same number of Russians.

In general appearance, size and condition of the specimens, most of the fruit was very fine, a credit to the exhibitors and a valuable object lesson to the many hundreds who looked upon it; and justifies the prediction that Wisconsin is destined to become a very good apple producing state.

THE AGRICULTURAL SOCIETY.

The day sessions of the agricultural society were taken up with the revision of the premium list for the next state fair, and the reception of reports of department superintendents of the last fair. The joint convention was formally opened in the assembly chamber by the president of the agricultural society, John L. Mitchell, in an opening address in behalf of the society, welcoming the farmers of the state to the convention. He tersely enumerated the interests represented in the various departments of the society, complimented the people engaged in the various industries upon the success being achieved, pointed with commendable pride to the high position occupied by Wisconsin agriculture and extolled the people for the interest they take, each in his chosen calling, and closed with picturing the advantages of country over city life. He was followed by J. M. Smith, president of the State Horticultural Society, with an able paper upon the future of horticulture in Wisconsin. He recommended as a means for its greater and speedy advancement, the establishment of a system of experiment stations located in different parts of the state, to be under the direction and supervision of the professor of horticulture, where practical experiments may be conducted for the development of varieties of fruits and vegetables best adapted to the various localities in the state. Mr. Smith closed with a fitting reference to the progress and success of the society since its organization and complimented the old veteran workers whose efforts had contributed to that success. Mr. Smith was followed by Gov. Hoard with an eloquent address on "Agricultural Education," which was heartily received by the large audience. The evening session was closed at a late hour with an interesting paper on the "Beautiful Side of Life," by Mrs. A. J. Clarke, of Waterloo.

February 6th the capital building was full to overflowing. The forenoon sessions were held in separate rooms. Before the horticultural society the secretary, B. S. Hoxie, read his annual report. He started out with the assertion that the successes of horticulture are builded largely upon the failures of the past, and that horticulture stands for more than the planting of an apple tree. He gave a general review of the workings of the society, recommended the organization of local societies, the holding of a circuit of popular meetings where they will accomplish the most good, and the general taking of good papers that contain horticultural literature.

Local societies next presented their reports, also members of the committee on observation. Some favored planting orchards with trees worked on Siberian stock. It was shown that insect pests had been worse than usual during the last year. Small fruits had generally done well, and there remained no excuse for any farmer's family being without an ample supply of them. The election of officers resulted in the choice of J. M. Smith, president; B. S. Hoxie, secretary; Mrs. V. H. Campbell, treasurer.

The afternoon was given to joint sessions of the two societies. Papers were read by Hon. S. H. Mead, of Shell Lake, on "Property Rights of Individuals." He held that farmers of this country have it in their power to obliterate all monopolies which oppress them if they will work together in harmony and concentrate their efforts for mutual benefit. "Lights and Shadows of Farm Life," by Mrs. V. H. Campbell, was a grand effort and well received by an appreciative audience. She likened life to a picture by a master artist, who so combines light and shade as to make the result a beautiful picture, holding the shadows in life as in the picture, in order that the light and joy of life may be the more prominent and appreciated. "It is not," she said, "the profession that dignifies the laborer, but the intelligent laborer dignifies the profession and the laborer together. Farmers should be educated upon general topics as well as upon those pertaining to their calling." Hon. Mark Curtiss followed with a discussion of "County Fairs," and Senator Kennedy, of Appleton, with "Agriculture—Its Dignity, Utility and Responsibility."

At the evening session Hon. H. A. Taylor gave an eloquent address upon "Farming in Europe and Africa," reviewing it from the palmy days of old Rome, and the fall of Carthage, down to the present time. Mr. Butterfield discussed "Unsolved Problems in Agriculture," and B. S. Hoxie concluded the exercises of the day by reading a paper prepared by D. S. Goff, of Genesee, N. Y., on "Some Questions in Horticulture."

Thursday the societies held separate meetings to accommodate the legislature with a morning sitting, and all the available room in the capitol was completely occupied. Before the horticultural society A. J. Philips, of West Salem, gave an address intitled "Shall the Farmer Raise his Own Fruit?" He contended that the farmer may successfully and, in a certain sense, profitably raise all fruit needed in his family by giving vigilant attention

to the planting of trees and plants. "In this state most trees are short-lived, hence the necessity of planting some new trees every year to take the place of those that die out. Every farmer should raise some trees from seeds of hardy varieties; if they do not bear fruit good enough they may be top-worked to something better." Chas. Hirschinger of Baraboo, related his experience in raising apple trees under difficulties that would discourage any but the stoutest hearted. Starting, when a mere boy by planting some seeds, he had tried high kinds, low kinds and every method that had been advocated during the last thirty years; had many times almost come to the conclusion that fruit growing was a delusion; was still at it, and last year harvested 2,000 bushels of apples. Wm. Fox, of Baraboo, read a very exhaustive and practical paper on grape culture, after which object lessons were given in methods of grafting and budding to secure hardy trees for the orchard, by Messrs. J. A. Cotta, of Illinois, and Hatch and Plumb, of Wisconsin. Mr. Cotta had on exhibition some fine specimens of double-worked trees, which we will allude to at some other time.

At the forenoon session of the agricultural society A.L. Hatch, of Ithaca, read a paper on "Orchard and Tree Planting on the Farm and Along the Roadside." He showed very conclusively that apple growing could be made a success, pointed out the soil, location, etc., best adapted to it, and named as the most successful varieties, Duchess, Tetofsky, Wealthy, Orange Winter, and McMahon White; also of Russians, Switzer, Repka and Longfield. The subject was discussed at considerable length and the discussion showed that public sentiment was drifting in favor of tree planting. Potato culture was called up in an exhaustive paper by S. B. Harrington, of Walworth county. He gave its history from the time of its discovery, at the time of the Spanish conquest down to the present, and showed its importance as a food-producing plant; he gave the details of the most successful methods of cultivation now in vogue. During the afternoon, dehorning of cattle, profits of poultry, bogus dairy products and trotting horses were all discussed, and the bee keepers held a well-attended meeting in another room.

At the evening session J. S. Anderson, of Manitowoc, addressed the convention on the "Relation of State to the Farmer." Dr. S. M. Babcock, of the experiment station, gave a practical talk on "Milk and Butter Production." And now the weary audience were served with a rare treat by Mrs. M. E. Warren, of Fox

Lake, who compared the condition of things forty years ago with that of the present; and Mrs. Helen H. Charlton, of Brodhead, with a paper on the "Power of an Idea."

Friday, the conventions continued their sessions during the forenoon. G. P. Peffer told the farmers what he saw in California at the time of the meeting of the American Horticultural Society last year, and J. M. Smith mapped out a system of horticulture for the farmer. Before the horticultural society the causes of the failure of orchards were pointed out by J.C.Plumb, which was followed by a general discussion of blight, sun scald, insects and methods of heading them off, root killing, protection by mulching and otherwise, time for pruning, etc. At noon the convention adjourned.

Thus closed the most interesting, profitable and largely attended meeting of farmers ever held in the Northwest. The proceedings of the convention have been very fully reported and will make a volume of 1,000 pages of practical, interesting agricultural and horticultural literature—containing the experiences, observations and ideas of the most successful men of the day. The state has made ample provision for its publication and distribution. Thirteen thousand copies of the joint report will be published for general distribution among farmers, and some 3,000 copies of the transactions of each association will be bound separately in cloth for the use of its members. This is the shortest course in agriculture and the harvest festival of the year. These annual gatherings are exerting a mighty influence for good, in brightening up the ideas and uniting the farmers in a brotherly union that will be cemented closer as time rolls on.

ADDRESS OF A. W. SIAS.

DELIVERED BEFORE THE SOUTHERN MINNESOTA HORTICULTURAL MEETING HELD AT ROCHESTER, JAN. 1 AND 2, 1889.

Gentlemen of the Southern Minnesota Horticultural Society, and Friends of Horticulture:

As this is the first day of the new year 1889, I sincerely wish you a happy and prosperous year. We are informed that the very first work that was planned for man by the Maker of the

universe was horticultural work, an example showing that January 1st is none too early for this society to begin to plan its work for the coming year.

This is our first annual meeting, and I wish to congratulate you on meeting under more favorable auspices than did the State Society at theirs, held on our fair grounds in this city, Oct. 3, 1867. They had only twelve paying members on their books at that time, while we have not lesst han fifty-nine. The past year has been a prosperous one for our society. We have no deaths to record, while good health generally prevailed.

The apple crop was better than 1887, and the small fruits panned out finely. We enjoyed a successful and well attended summer meeting on the Fourth of July, and had a fine display of strawberries. Mr. John Bamber, a member of our executive committee, has demonstrated what but few knew before, viz., that two hundred fine strawberry plants could be produced from a single berry. The foliage on these new varieties was grand almost beyond comparison. They have not fruited yet, but we shall look for something choice when they do. In view of our high anticipations, I will recommend that you appoint a committee of three to visit the seedling strawberry beds in the vicinity of Rochester as soon as the fruit is ripe, and report at the next summer meeting. With the horticulturist in a new country like ours, poverty appears to be a blessing in disguise, and so it proved to be in my case. When I began my experimental work on College hill, I was anxious to stock up well on young evergreens of all sorts that had any show at all to succeed here; as I had considerable taste for that kind of work. At that time I should have been obliged to go too far southeast for them, and like many others, should have lost heavily, no doubt. But I did muster change enough to buy several pounds of evergreen seed, and the result has been that about nine-tenths of my sales of evergreens have been my own seedlings, and from these seedlings this last Christmas, I sold trees for churches to the amount of over $20, ranging from $1.50 to $3 each, and fifteen to nineteen feet high.

I would like to emphasize this word seedling. You can hardly indulge in them too much—seedlings of all descriptions.

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In conclusion, allow me to remind you of what you all know to be a fact, viz.: That it is only by persistent and united effort that we can accomplish much through this society, while by this, it is

possible for us to astonish ourselves, and the horticultural world. We are informed that ancient Babylon by united effort, built the "hanging gardens" that gained the reputation of being one of the seven wonders of the world, all on about four acres of land. If this is true, what may we not hope to accomplish with the whole fertile field of Southern Minnesota at our disposal, providing we lay aside petty jealousies and selfishness, and unite in doing our "level best."

The following paper was read at the meeting at Rochester:

EVERGREENS OF WESTERN ONTARIO.

By D. W. Beadle, St. Catherines, Ontario.

The species of evergreen that is most abundant in the western part of the Province of Ontario is the White Pine, *Pinus strobus.* It grows chiefly on dry sandy soils, and is one of our valuable timber trees. It has not been planted as an ornamental tree to any extent, and only in one instance within the writer's knowledge as a windbreak or shelter belt. When grown singly in the open ground, it is by no means wanting in attractiveness. The branches form regular strata one above the other, and the play of light and shade, the shade deepening as the density of the foliage increases until the green becomes almost black, produces an effect that is not without a certain grandeur. It is not a tree for city lots or suburban lawns, but for country residences, where the size of the lawn is in keeping with the majestic sweep of its branches.

The Red Pine, *Pinus resinosa,* is very abundant in the northern counties. I have never seen it used as an ornamental tree, and its habit makes it unsuitable for small grounds, but in parks of considerable size it could be planted with good effect. The beautiful red color of the bark, which gives it its name, contrasts finely with the long dark green foliage.

The Gray Pine, *Pinus banksiana,* I have never seen, though it is said to be abundant in the vicinity of Hudson's Bay. Loudon says of it that as an ornamental tree it is one of the most interesting "from the graceful manner in which it throws about its long, flexible branches, which are generally covered throughout their whole length with twisted, glaucous-green leaves, with here and there a whorl of curiously hooked horn-like cones."

The Hemlock Spruce, *Abies canadensis*, is also found in considerable quantity. In my estimation it is the most beautiful evergreen tree of our temperate climate, either native or foreign. Had it been brought from some foreign country, doubtless it would long before this have been extensively planted and our horticultural and arboricultural publications would have been filled with its praises. We venture to affirm that there is not another evergreen that will thrive in this latitude that can equal it in elegance and gracefulness; and yet it has been seldom planted for ornamental purposes. The upper and under sides of the leaves are in marked contrast, and when the tree is swayed by the wind, the foliage presents a pleasing play of light and shade.

The Balsam Fir, *Abies balsamea*, is also quite common, especially in the northern parts of this province. While young it is very handsome, and for a number of years is a very ornamental tree, but unfortunately as it reaches maturity the lower limbs lose their foliage and gradually die, giving to the tree a very unsightly appearance.

The Black Spruce, *Abies nigra*, also seems to be most at home in the northern counties. When growing in deep alluvial bottoms it makes a handsome tree, but like the balsam fir, it grows unsightly with age.

The American Arborvitæ, *Thuja occidentalis*, grows abundantly in moist places. This evergreen is well adapted for planting in grounds of quite moderate dimensions, as a hedge plant. It is very patient under the knife and can be trimmed into any desired form. On account of our winter snows, it is important that when used as a hedge it be trimmed to a steep slope.

The Red Cedar, *Juniperus virginiana*, is most abundant in the southern counties. It has not been much used in ornamental planting, but is well adapted for that purpose on grounds of considerable size, inasmuch as the trees take on a great variety of form and give a very picturesque effect to the landscape. It has been used to some extent for hedging, but so far as my observation extends the result has not been satisfactory; the trees do not seem to bear being planted so close together.

The Common Juniper, *Juniperus communis*, also varies greatly in its habit of growth, and might be used with good effect in landscape gardening, but like the red cedar does not bear being crowded, or planted so close as would be necessary in making a hedge.

The Prostrate Juniper, *Juniperus prostrata*, is a very pretty trailing evergreen, of a dark green color, that might be used with good effect in ornamental planting. It is quite abundant in some parts of Ontario, particularly, as I am informed, along the shores of Lake Huron.

The White cedar, *Cupressus thyoides*, I do not know that this tree is found in Canada. If it is it will be only in the southern portions, and in low, marshy ground. It is not probable that it will be much used for ornamentation except it be for making hedges. It has been used in the State of New Jersey for this purpose with excellent results.

The American yew, *Taxus baccata var. Canadensis*, is a very pretty small evergreen when grown in cultivated ground, and can be pruned into any shape. The foliage is dark green, of a somewhat sombre hue. The seed is naked and is borne singly in a berry-like, pulpy, cup-shaped disc. Though not so abundant as those already mentioned, it is by no means uncommon, and is generally known under the name of ground hemlock.

These constitute the most noticeable of our evergreen trees. They are all hardy and should all endure your climate so far as cold, even extreme cold, would effect them. The fact that they are native American trees is against their being planted by Americans, because, I suppose, it is not fashionable.

After a time a better sentiment will prevail, and gentlemen of wealth and good sense will be able to recognize the beauty of our native trees and their adaptation to American soil and climate, and will plant them, thereby securing permanent embellishment to their estates.

LETTER FROM MR. HILLMAN.

MINNEAPOLIS, MINN., Dec. 26, 1888.

A. W. Sias, President Southern Minnesota Horticultural Society.

DEAR SIR: Your favor of recent date is received, asking me to contribute a paper for your next annual meeting, now near at hand. In reply would say I have little spare time at present in which to tell what I know of horticulture. My experience, as you know, has been somewhat limited in the æsthetic art—perhaps more theoretical than practical—and yet I was early taught of the mysteries and beauties of vegetables, fruits and flowers. I think it was Daniel Webster once said something to

the effect "that he never could get the hang of a scythe and always thought it hung best from the limb of a tree;" and although he was reared on a farm he soon forgot to a large extent the character of his early training.

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We have from time to time had occasion to visit a number of orchards in Olmsted county which appeared to be well laden with fruit; and it has often been a source of gratification to note all the sure indications of steady progress being made in the production of choice and hardy varieties. We do not doubt there are in your county many favorable situations to be found where with proper care and attention, an orchard might be made highly remunerative.

The difficulties to be encountered in fruit growing in this state are by no means insurmountable, but the experience of the past, repeated and numerous disasters and failures, admonish us that there are obstables to be overcome, or guarded against, if anyone would meet with any marked degree of success and profit in the industry. There must of course be intelligent culture and the exercise of watchfulness and care at every step.

Prof. Budd, of Iowa, has given some valuable suggestions on this subject. He says: "A tree that will endure our test winters well must maintain perfect foliage during our hot, changeable summers, and must be as determined of habit of ripening its wood as the box elder or hickory, and must have a cell structure practically incapable of freezing." He further states: "We absolutely can not expect to produce a seedling hardy enough to endure our test winters when in bearing, unless it shows in leaf, bark and wood cell its descent from the crabs or Russians."

If the position taken upon this subject by our best authorities be correct, we have at once a ready solution for the cause of many of the discouraging failures and drawbacks of the past. It would seem to be very clearly demonstrated that the old and common methods, and careless, thoughtless, hap-hazzard system of orcharding, so generally practiced heretofore, must be abandoned altogether in the future. In order to succeed with orcharding in Minnesota attention must be given to the character of the soil, location or exposure, drainage, selection of varieties, methods of training, pruning, protection, etc. All these matters of detail will be investigated patiently and thoughtfully, if one is really in earnest to attain the highest measure of success. And we might add in this connection, we have grave doubts if much

encouragement can be found by farmers and fruit growers of this state in any easier or less painstaking methods.

It is well known that many of our careful growers have from time to time produced abundant crops of apples, that as to size and excellence of quality were unsurpassed by productions of orchardists of other sections in the East or South. And it has also been demonstrated that we have here a number of hardy kinds that have sufficient merit to recommend them for general introduction and cultivation, at least for trial. Of course it must be borne in mind that one must get his trees from hardy stocks and such as will be found when fruiting, true to name. Some of the new Russians are yielding satisfactory returns, and those that have been tested will prove more satifactory than mere experiments with semi-hardy and unknown varieties.

There is much to be hoped for in the investigations being made from year to year by careful growers, as well as from the experiments being carried forward at our experimental and horticultural stations. The meetings being held from time to time for the purpose of eliciting useful information on these important topics is all important and in the right direction, and gives assurance for the hope that we may speedily behold the day when we shall raise a rich abundance of choice and healthful fruit.

It would afford me pleasure to attend your annual meeting were I not otherwise engaged. I trust you may have a large and very successful meeting.

Very truly yours,

S. D. HILLMAN.

ANNUAL ADDRESS, AT HUTCHINSON.

By M. Outler, Sumter.

Members of the McLeod County Horticultural Society,

LADIES AND GENTLEMEN: We have met once more for the purpose of comparing notes and obtaining such horticultural information as will be of benefit to us in the future. We have come together under much more favorable conditions than last winter. Then it was a howling blizzard and forty or more degrees below zero; now, we are enjoying an old fashioned Indian summer.

The vicissitudes of the past season have been many, and exhibited in various ways. In our own state the farmers' prospects have been blasted by drought in one part and blighted by floods and heat in others. Jack frost ruined the corn crop of one and the grape crop of another. Still, with all these calamities, there will probably be little suffering in our state for lack of food or clothing, and we should feel thankful for what we have.

While crab apples and plums were nearly a failure in our county vegetables were fine, and there are probably more nice potatoes stored in the cellars of McLeod county than ever before.

From observation we believe there are many more failures than successes in strawberry culture. While we had a fair crop of fine berries (harvesting over 3,000 quarts for about an acre), we saw fine looking beds that produced only a few seedy buttons, and they were Crescents, one of the most productive kinds grown. The cause of failure was that no staminate or perfect blossoming kinds were set with them.

BLACKBERRIES.

My experience the past two years has convinced me that this fruit can be grown in our county with as much certainty as any other crop. I obtained my first crop of Ancient Britons this season amounting to about two hundred and twenty-five quarts and am fully convinced that the stories our Wisconsin friends have told us of their productiveness are true. Although I have seen acres of blackberries growing in a wild state I never saw bushes more heavily laden or of finer looking berries. A. G. Tuttle, of Baraboo, Wis., claims to have grown at the rate of 6,000 quarts per acre. Chas. H. Hamilton, of Ripon, Wis., is the leading grower of the Northwest having several acres under cultivation. See his valuable paper in the reports for 1886.

STATE HORTICULTURAL SOCIETY.

To those interested in horticulture, no better investment can be made than to join this society and attend its meetings. For the first time I attended the last summer meeting at the state experimental farm last June, and I do not believe finer strawberries were ever exhibited. Of the new kinds, Kramer's Seedling, Lyon's Seedling, Jessie, and Bubach were very fine, and we think no one will make a mistake in investing in a few plants of

those kinds. I am pleased that McLeod county succeeded in carrying off some of the premiums.

FORESTRY.

We do not think enough interest is manifested by our farmers in the cultivation of forest trees. While we have many fine groves of willow and cottonwood trees, we believe that the value of our farms would be increased enough to many times pay for the trouble of cultivating if at least ten acres of each quarter section were set to ash, maple, evergreens, etc. We hope forest tree cultivation will be encouraged in every possible way by our citizens until there shall be many more fine groves to temper the arctic breezes that come upon us every winter. The people of this beautiful village of Hutchinson, surrounded on nearly every side by magnificent forest trees are in a condition to appreciate the benefits of forest tree preservation and cultivation.

APPLES AND PLUMS.

The prospects for successful apple culture in our county are not very promising, and until a tree is originated that can successfully run the gauntlet of jack rabbits, mice, blizzards, drought and blight, it will be more profitable to raise wheat, hogs, poultry, etc., and buy your apples. Several fine plums have been found that are of good quality and hardy, and I think you will make no mistake in purchasing a few trees of each kind recommended by our State Society.

We hope our coming together has been productive of some good, and that from the work done by this and kindred societies much interest may be awakened in the cultivation of trees, fruits and flowers.

The following interesting paper was received too late to be read at the annual meeting of the Society:

HARDY PERENNIALS.

By Mrs. Lavina Warwick, Medo.

Why is it that so few hardy perennials are cultivated? When once planted they are lasting and do not need the fine weeding and care required to grow annuals. The peony is one of the noblest and showiest of flowers, also fragrant, since we have the

Chinese varieties. I find them all entirely hardy. By having a dozen or more varieties one can have them in bloom from early May until after the Fourth of July, by having a list selected, to include early, medium and late.

Earliest of all is a variety called Smitzii; single, dark crimson flower; foliage resembling *Pae. tennifolia* Next in order comes the Old Double Red Toe Peony, that many of us remember from childhood. I find they require a trifle more care than the Chinese varieties, but when once well established, prove hardy as need be. When I first attempted to grow them here I lost a number of fall set plants, while now I save all, by putting a mulch of two or three inches of leaves over them, with a few handfuls of soil scattered over to keep the leaves in place; then I lay down a couple of sticks of fire-wood, one on each side of plant, and on these lay boards to keep the rain off during the fall and spring. About the first of May I remove boards and draw back the leaves. I am sure one will soon feel rewarded for the trouble. I have never lost a plant when treated in this way.

Next in order I have a couple of single varieties, very showy, bright red, yellow centres, that blossom one after the other. Then comes Double White, very free, full, double and showy; should be in every collection. Fragrant White; not so large a flower, pure white, pink centre and exceedingly fragrant. Then we have pink peonies, immense in size, showy and free, but can't gives names of them. Perfection; a delicate, showy variety, pink and white; fragrant. Fragrans, a bright red variety, growing three and a half feet tall, double, showy and fragrant; should be in every collection. However small, after peonies are well established I seldom take the trouble to cover them in winter, unless the soil needs enriching.

In preparing the ground I find the old saying applies, that anything worth doing is worth doing well. I find this especially so with perennial flowers, for when once started they last many years. I prefer to prepare the ground before setting the plants, by adding for each plant one pail full of wood ashes, about a bushel of chip manure, also the same of stable manure; the whole thoroughly mixed with the soil by spading deeply, over and over. The bed should be raised a trifle higher than the surrounding ground that water may not stand and freeze over the plants, as many plants are lost from this cause. If there is any trouble from ants sapping the juice from peony

buds, I find one pan full of wood ashes scattered around the plants a sure remedy.

The above varieties should be planted deep enough, so the upper buds are two inches below the surface, as almost invariably those inexperienced set the plants too high, and lose them in the course of a year or two.

I find it necessary with Chinese varieties to lift the whole root; then it is an easy matter to divide them. In resetting a large plant, it is better always to divide them, as they often rot in the centre when not divided, and it is then a long time before they blossom. I always give all peonies a mulch of leaves the first winter, not so much to protect from cold as to keep the spring frosts from heaving them before they are well rooted. I find our black soil admirably adapted to their growth, for I have counted sixty-four immense blossoms and buds on one plant at one time.

The hardy Irises are long lived, with delicate, fragrant flowers. Lilies of the choice, fragrant varieties need a sandy soil, with a covering of leaves in winter. The Lemon Lily is a choice flower, with showy, delicate yellow, fragrant flowers in June; entirely hardy.

The Oriental Poppy is a desirable perennial, hardy; flowers a reddish orange, very brilliant.

The Purple Sweet Rocket is a biennial, with showy reddish purple, fragrant flowers, hardy, and will grow from seed. The different varieties of perennial phlox, which blossom from the first of August until the first of October, are entirely hardy, and their delightful fragrance and beauty make them useful at a time when flowers are scarce.

I find a good many have difficulty in getting snowballs to grow. Layering is the only way to get new plants. When in bloom I take stems of the last season's growth, bend them down and peg them fast; then cover the stem with four or five inches of soil, bending the branch up to form a top and bracing it by putting a chunk of wood against it. By the last of September we will find them a mass of fibrous roots in good condition to move; after being set out, the top must be laid over on the ground and about three pails of soil heaped upon the root, covering the stem with the exception of three or four inches of the tips. In the spring uncover and lift up the top repeating this each fall as long as you can bend the plant over; when too large to bend down they are hardy, and with good rich soil you will have no trouble in growing snowballs,

and they will blossom very early. I have nine snowballs that when only two and a half feet tall averaged just fifty-eight large blossoms apiece; they are now large and thrifty, and for the last two years have been completely covered with snowbanks, but have come out all right. Persian and common lilacs were nearly all killed from the effects of the snow. The Japanese snowball, *viburnum plicatum*, after making a good summer's growth, winter killed, with protection. Hydrangea Grandiflora I don't find very reliable here.

The Japanese Quince and Purple Fringe (smoke tree) both winter killed the first winter. Missouri Flowering Currant, when in good thrifty condition and well pruned, will be loaded with its pendant, bright yellow blossoms, filling the yard with perfume. I have one variety of Syringa, hardy and fine, although I have forgotten the name.

Our choicest roses require winter protection. I have one variety that repays the trouble, that is the Luxemborgue Moss, full double, free and fragrant, crimson. The Jack Clematis is a climbing vine of great beauty, with deep blue, velvety flowers; an abundant bloomer; also another variety of the same, called Coccinnea, with small, bright vermillion red flowers; both require a good coat of leaves as a winter protection.

NOTE.— We desire to call attention to the report of the department of agriculture and of the state experiment station, recently issued by the board of regents of the University of Minnesota, as a supplement to their fifth biennial report. It contains four hundred and seventeen pages and furnishes much valuable information of interest to horticulturists and others, including Prof. Lugger's report on entomology and botany, etc., etc. Five thousand copies have been printed and all members of the Society will receive a copy of the report.— SECRETARY.

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